

Railway Age Gazette

Including the Railroad Gazette and the Railway Age

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THE character and extent of the work that has been and is being done by the railways of the United States to promote the improvement of agriculture is strikingly illustrated by the bulletin on "Railroads and Farming," issued by the department of agriculture, which is abstracted in another part of this issue. Probably the most interesting feature of this document is to be found in the four tables that have been compiled to show in a tangible way some measure of the extent to which the railways have engaged in agricultural promotion enterprises. The statement of Mr. Andrews, the author, that the railways have been the most prominent of all classes of non-agricultural concerns that have aided in the development of agriculture, will hardly be questioned; and, while it is, of course, impossible to estimate even approximately the amount that such work by the railways has accomplished, the tables showing the mileage and percentage of railways that have engaged in various kinds of agricultural promotion demonstrate impressively the important public service that they are performing in this way, in addition to the transportation service which they are directly engaged in rendering.

IT would appear that there is a greater field for the use of drop forgings for car and locomotive equipment in this country than has thus far been developed. H. T. Bentley, assistant superintendent of motive power and machinery of the Chicago & North Western, who made a trip to England during the past summer, drew attention to this in an address which he made before the Railroad Master Blacksmiths' Association last August. One railway shop plant which he visited contained about 50 hammers, which turned out work ranging from very small to large pieces. H. W. Jacobs, in an article in this issue, calls attention to the extent to which drop forgings are made at the Crewe shops of the London & North Western in England. The important advantages of making the parts in this way, rather than casting them, is that they do not require any great amount of machining, are interchangeable and are much lighter for the same strength than castings would be. The recommendation of both of these men that there is a larger field for drop forgings on railway equipment in this country should receive careful consideration, for both of them are eminently well qualified to pass on this subject.

FOR a long time we have been trying to arrange for a series of articles on foreign railway practice, more especially in connection with the maintenance and design of equipment, as seen by a railroad officer from this country, who from his training and experience could properly select those things in foreign practice which might be applied on this side with good results. While it is comparatively easy to obtain descriptions of details of foreign practice, it is quite another matter to find a railroad officer who is planning to go abroad and can size things up from the standpoint above suggested. When we found, a few months ago, that H. W. Jacobs was planning such a trip, we immediately tried to arrange with him for a series of articles of this kind, knowing that he was well fitted by experience to select those details of foreign practice which might be applied to advantage in this country, or at least might offer suggestions as to improvements in our methods. The article in this number on Impressions of British Railway Practice is the first of a series of articles which Mr. Jacobs has prepared for us and which we hope to publish within the next few months. Before entering railway service Mr. Jacobs had an extensive experience as a machinist, structural ironworker, tool designer; also with electrical machinery and in marine and general repair work. With this as a foundation he entered the service of the Chicago, Burlington & Quincy as a tool foreman, and in 1903 was made a shop demonstrator on the Union Pacific. A short time later he was placed in charge of the shop practices and methods for all of the shops on that system; and in 1904 was

made engineer of shop methods of the Atchison, Topeka & Santa Fe, later being made assistant superintendent of motive power. Within the past few years a great many officers of foreign railroads have visited the Santa Fe and studied its motive power department methods. In this way Mr. Jacobs had a wide acquaintance among these officers before he went abroad, and he was most courteously received. In looking into foreign railway practice he was well aware that the size and construction of the equipment and the facilities for repairing it are so entirely different from American practice that it is out of the question to get any accurate data for comparing the cost of the various operations. His idea, therefore, was more to study into the designs and methods, to see whether in a broad way they might be applied to American conditions. That his observations have been successful in this respect is indicated by the article describing his impressions of English practice, which are based largely on a visit to the London & North Western works at Crewe, England.

THE Executive Committee of the American Railway Association has appointed the commission to investigate and punish cases of misuse of freight cars which was provided for in per diem rule 19, adopted at the meeting in New York last May (*Railway Age Gazette*, May 17, page 1098). It consists of Fairfax Harrison, president of the Chicago, Indianapolis & Louisville; R. H. Aishton, vice-president of the Chicago & North Western, and T. E. Clarke, assistant to the president of the Delaware, Lackawanna & Western. This commission may impose fines at its discretion, the minimum being two dollars for each wrongful diversion; the intent of the rule being, evidently, that the commission shall make examples of persistent misuse by one road of the cars of another. We understand that some cases are ready and waiting for the commissioners to take up. Of the suggestions made by the Interstate Commerce Commission in its deliverance published last week (page 898) the only practicable one (unless the commission were to at once order the 45-cent rate put in force, anticipating by a month the railroads' action, and were to impose something like the California rate on dilatory consignees) was that calling on the carriers to report to Washington cases of wrongful misuse of cars. This action of the officers of the American Railway Association is the most feasible response that can be made to the demands of the governmental body. To raise the interchange per diem rate on short notice would create many serious disturbances. The government might possibly do such a thing without encountering impassable obstacles, but the railways could not. To report wrongful diversions to the government, as suggested, would involve the operation of such a vast amount of ponderous legal machinery that the beneficial results would not be likely to materialize till the stress was over. To get a good grasp of the subject the Interstate Commerce Commission would have to investigate a hundred diversions, very likely. The railroad officers, on the other hand, know the field thoroughly, already. Like the Dutch justice, who told the culprit that his petty crime was not proved, but that a fine of \$5 would be imposed because "it is so much like you," they can apply needed punitive measures with little delay. Not that we advocate "Dutch justice"; but a knowledge of its methods on the part of judicial bodies often proves good for society!

THE insurance, pension, accident- and sick-benefit scheme announced by the Western Union Telegraph and allied companies (noticed in another column) is the most elaborate, extensive and costly proposal of the kind ever adopted by a non-public corporation. It is to be looked upon, doubtless, as a definite move to forestall the passage of laws by state legislatures imposing burdens of this kind on corporations as a legal obligation. At any rate, the plan may well be considered in that light, whatever may be the intention of the companies. There can be no doubt that public sentiment throughout America is going to

require employers of large numbers of persons to bear a greatly increased share of the risks which the employees have to carry; and it would be very much better if the employers could carry on, or at least start the reform on their own initiative, rather than by the process, usually clumsy, of legislative compulsion. However, this is too much to hope for, speaking generally; but President Vail is to be congratulated on being in a position to launch his great scheme. Indeed, he will be the envy of American railway officers, many of whom would be glad to do what he has done if their financial shackles could be loosened. To be as free as are the telephone and telegraph companies from statutory rate restrictions would be such a strange sensation to the railway manager of today that he would begin to doubt his own sanity. Only in his dreams or in his studies of the past do such thoughts ever occur to him. But President Vail is to be credited with a bold stroke, notwithstanding the wealth of the telephone companies; for the telegraph company also is included, and that department of his business is not in such very easy circumstances. Moreover, both telegraph and telephone are at the mercy of the legislatures, and seem likely to become as much so as the railroads; though as yet they do not have to see large armies of their own employees sending committees to the legislature to demand laws for the oppression of their employers. The detail operation of Mr. Vail's scheme will be of much interest to railroad men. In fixing the retirement age at 60 he has been more liberal than anybody before has dared to be, on so large a scale. However, the business is one from which a considerable proportion of the persons on the pay rolls retire voluntarily at an early age; probably a much larger proportion than on any railroad. The cost of indemnifying employees for accidental injuries and deaths will also be very low, as compared with the similar burden in the railroad service.

RUNNING RAILWAYS BY REFERENDUM.

AT the election on November 5 there was submitted to the people of Arizona on a referendum ballot the question of approving or disapproving a bill passed by the legislature reducing passenger fares in the state to three cents a mile. There were also submitted five other bills, all adapted to increase the expense and difficulty of operating railways in the state. When the purchasers of a commodity are asked to vote on how much they will pay for it, they are pretty sure to vote to pay a lower price. It was so in this case. The fare bill carried. The same is true as to the other bills which require a semi-monthly payday, electric headlights, a restriction of the length of freight trains to 70 cars, three years of experience for enginemen and conductors, and a third man on every locomotive.

On the same day there was referred to the people of Oregon under the initiative and referendum a bill prescribing a percentage relation between carload and less than carload freight rates, based on the minimum carload weights, and it was passed. This remarkable measure bore the remarkable title, "An act to provide for a uniform percentage in the relationship of the classification ratings, to provide for the establishment of minimum carload rates, to fix the maximum rate on the basis of the less than carload rate of the article, and the minimum carload rate that may be charged on carload shipments of property, the rate upon which the carload rates shall be compiled, and prescribing penalties for the violation of the act." Among other things, the bill provides that when the minimum carload weight is less than 20,000 lbs. the carload rate shall not exceed 70 per cent. of the less than carload rate; when between 20,000 and 30,000 lbs., 59 per cent. of the L. C. L. rate; when between 30,000 and 40,000 lbs., 50 per cent., and when between 40,000 and 50,000 lbs., 42 per cent.

The Oregon railway commission carried on an extensive publicity campaign in an effort to defeat the bill. It asserted that its provisions would operate entirely in favor of the wholesale and jobbing interests and the larger shippers generally, and that it would permit the carriers to advance many carload rates

previously less than the prescribed percentages of the L. C. L. rates. As the carload rates were predicated on the L. C. L. rates without any provision for a basis on which the latter should be made it was held that the bill was class legislation in favor of the carload shippers.

Although the bill would have advanced some rates, the railways naturally opposed the fixing of carload rates by any such unscientific method as to take but one factor—the carload weight—into consideration. We are not informed as to the origin of the bill, but it undoubtedly originated among those who expected to profit by it, and its passage may probably be ascribed to the fact that it was directed against the railways. The *Portland Oregonian* says of the result of the election, "The apparent approval of the railroad rate bill is one of the unaccountable results of the vote. The phases and extent of the bill were beyond the comprehension of even railroad men and rate experts, and could not have been understood by the people."

The railways have become somewhat inured to the vagaries of regulation by a multiplicity of commissions, and even to occasional instances of rate making by legislature. When the most complex questions of railway rate making and the most difficult problems of railway operation are submitted to a plebiscite regulation of railways descends to the level of a farce. Fortunately, the constitution of the United States provides that no state shall take property without due process of law; and probably the only result of these precious exhibitions of public unfairness and governmental imbecility will be a pretty batch of lawsuits.

THE HEAD OF THE MOTIVE POWER DEPARTMENT.

TWICE within the past month our attention has been called by travelers from abroad to the great contrast between the position of the head of the motive power department on American railways and in foreign countries. Mr. Jacobs in his article on Impressions of British Railway Practice, in this issue, draws attention to the relatively more important position of men at the head of the mechanical departments of British railways, as compared to American railways. Who is responsible for this and why is it that American motive power officers are not regarded in the same light, or entrusted with the same authority, as are those in foreign countries? Possibly one reason is that the executive officers of roads in this country have underestimated the importance of properly selecting, designing and maintaining locomotives and cars. It is no secret that in many cases the recommendations of mechanical engineers and motive power officers have been over-ruled because of the desire to save a few dollars per unit in the cost of new equipment. This ought not to be, but possibly in many cases it has been brought about because the head of the motive power department, or his assistants, have looked at the problem from a purely technical standpoint and without a keen realization of the commercial or operating phases of the question. Because of this the higher executive officers may have been led to discount their recommendations. Fortunately a better appreciation of the importance of having the mechanical department properly administered is growing on many of the executive officers, and at the same time the mechanical department officers are realizing more and more that they are part of a large unit and that the department cannot be segregated and must solve its problems with a view to getting better results from the operation of the equipment.

It would be interesting to analyze the way in which a motive power department head puts in his time each day. We might be very greatly surprised at the time which he finds it necessary to give to representatives of the supply interests who want to impress him with the merits of the various devices which they have to sell, and also to the equally large amount of time which is often expended in doing work which could well be done by subordinates. For instance, more than one motive power officer is required to personally sign and pass on all passes which are given to men in his department. While it is important that the pass privilege should not be abused, surely it is not good policy

for a man at the head of a department, which may expend hundreds of thousands or millions of dollars yearly for labor and equipment, to spend his time in that way. It is not unusual for a motive power department officer to spend hours of his time every week signing bills or other documents which he does not have time to examine critically but which, because of rules and regulations, require his signature. It is a mistake to ask a man in such a responsible position to do this work.

A successful motive power officer must be an executive—and a strong executive. He must insist upon routine work being done by his subordinates in order that he may stand off and gain a broad view of the situation. His function should be to inspire and direct the efforts of the men who report to him and to so standardize the work of his department that he will only be called upon to treat with and consider the exceptions, or the cases where deviations are made from the established standards. If he is given the opportunity of doing this, and takes advantage of it, he will automatically make for himself a position equal in importance and dignity to that of any of the foreign railway motive power officers. It is rather significant that within recent years two or three motive power officers have been given titles which indicate that their positions are of a more executive sort than is suggested by the title of superintendent of motive power, or mechanical superintendent. We will not obtain the best results in the selection and maintenance of motive power and rolling stock in this country until our motive power officers generally qualify themselves to fill this larger position and are given an opportunity to do so.

THE MAIL PAY QUESTION.

THE statement recently issued by the Committee on Railway Mail Pay, an abstract of which we publish elsewhere, is a destructive criticism of the estimates made by the postmaster general in house document No. 105, 62nd Congress, as to the expense incurred by the railways in handling mails and as to the reductions that could be made in their present mail compensation without reducing it below what would be reasonable. The statement will convince reasonable persons that the present method of fixing the payments for mail transportation is irrational and unjust, and that it ought to be changed so as to secure to each railway earnings proportionate to the service that it renders and to the railways as a whole greater compensation than they now receive.

Perhaps the most striking feature of the Mail Pay Committee's statement is its showing as to the immediate effect on the railroads of the parcels post law. The compensation of the railways for hauling the mails during each four year period is based on the weight of mail carried during approximately the first three months of the period. It makes no difference how much the mail that a road carries increases, its receipts for the service are the same at the end of the four year period as at its beginning. In passing the parcels post law Congress made no provision for re-weighing after the parcels post traffic began to move. The post office department could cause a re-weighing, but its attitude is such as to give little hope that it will do so. Undoubtedly, a large amount of parcel traffic will be shifted from the express cars to the postal cars. Every pound that the railways lose from the express cars will reduce their compensation for carrying express, and unless there is a special re-weighing they will get nothing whatever for handling the mails transferred to the parcels post for long periods. The period during which the New England roads will have to render this service without compensation, as shown by the committee, will be four years and six months, and the periods for the railways in other weighing sections will be as follows: Second weighing section, three years and six months; third weighing section, two years and six months; fourth weighing section one year and six months; that of the part of the first weighing section not located in New England, six months. This is not regulation; it is robbery.

The committee shows very clearly the injustice and absurdity

of the method employed by the postmaster general to demonstrate that the mail compensation of the railways could fairly be reduced. He first used a wholly erroneous method for determining the expense incurred by the railways in transporting the mails, and then, having by this method made the expense appear much less than it was, he contended that the roads were entitled to receive only the actual expense incurred by them, and in addition 6 per cent. of this expense. As the committee points out he completely ignored the principle that every economist and every court recognizes, namely, that railways are entitled to earn a fair return on the fair value of their properties. If the roads were entitled to earn from hauling the mails only the operating expenses thus incurred, and in addition 6 per cent. of these expenses, then clearly from all of their business they would be entitled to earn only their total operating expenses, and in addition 6 per cent. of those expenses. Their total operating expenses, including taxes, in the fiscal year 1910 were \$1,926,426,134. Six per cent. of this is \$115,585,568. The latter sum is, therefore, on the postmaster general's theory, the total net earnings that the roads are entitled to receive. The cost of road and equipment of the railways of the country as reported by the Interstate Commerce Commission in 1910 was \$14,387,816,099. This amount is slightly in excess of the net capitalization reported for the same year. The amount of net which on the postmaster general's theory the railways are entitled to earn, namely, \$115,585,568, would give a return on cost of road and equipment of only *eight tenths of 1 per cent.* As the committee points out, under this scheme the net earnings would not pay one-third of the interest on the railways' funded debt; and every road in the country would be thrown into irretrievable bankruptcy.

The fact that the post office department can seriously advance and defend a principle of compensation whose general application to railway charges would bankrupt every road in the country shows that they are unsafe guides for Congress to follow in dealing with this matter. There is really only one wise and fair way to deal with the subject, and that is for Congress to pass a law providing that railway rates for carrying mail, like railway rates for carrying freight and passengers, shall be reasonable and not unfairly discriminatory, and give the Interstate Commerce Commission exactly the same power to fix these rates that it now has to fix rates for passengers, express and freight. If the Interstate Commerce Commission is good enough to decide what rates the shippers and travelers of the country shall pay to the railways, it is good enough to decide what rates the government shall pay them.

NEW BOOKS.

The Coking of Coal at Low Temperatures, with a Preliminary Study of the By-Products. By S. W. Parr and H. L. Olin. Bulletin No. 60 of the Engineering Experiment Station of the University of Illinois. Copies may be obtained upon application to W. F. M. Goss, director of the Engineering Experiment Station, University of Illinois, Urbana, Ill.

The studies give the details of a large number of experiments on the low temperature distillation of coal not exceeding approximately 750 deg. F. Certain fundamental principles have been developed which underlie the coking of coals of the Illinois type. A striking illustration is given of the fact that even a small amount of oxidation of the coal diminishes or destroys its coking power. Superheated steam was used to remove all traces of an oxidizing atmosphere. Freshly mined coal was found to be essential in the experiments. The by-products consist of illuminants of high candle power, of tarry material which consists in the main of oils, and a coke which has a composition somewhat similar to that of the so-called smokeless coals. The nitrogen recovery is small, not exceeding 5 per cent. of that material present in the coal. The results seem to justify the conclusion that a fuel can be produced suitable for use in domestic appliances, as well as under industrial conditions, and that the theoretical principles developed point to the possibility of making a good type of coke from Illinois coals.

Letters to the Editor.

HIGH SPEED ELECTRIC RAILWAY SERVICE.

ANN ARBOR, Mich., November 2, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

On page 839 of your issue of November 1, 1912, Mr. Storer in his paper on Railway Trunk Line Electrification is quoted as saying: "The single-phase system is the only one that has successfully solved the problem of current collection at high speed."

This statement is incorrect. The highest speeds thus far attained in railway service were on the German line from Berlin to Zossen during the famous high speed trials of a few years ago. The three-phase system was used and the current collection was entirely successful, even at speeds as high as 125 miles an hour.

C. L. DE MURALT,
Professor of Electrical Engineering, University of Michigan.

THE PUBLIC AND THE "SAFETY FIRST" MOVEMENT.

CHICAGO, October 15, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Right on the head—and hard—was where the *Railway Age Gazette* hit the "safety first" proposition in the editorial in its issue of October 11, entitled, "When Will the Public Join the 'Safety First' Movement?" When will the public reduce that 5,000 laboring men killed each year while trespassing on the railroads in going to and from their work? And right here in Chicago seem to occur the worst offenses.

As a part of the "public" the Chicago department of the Y. M. C. A. is preparing to attack this subject vigorously in a new book about to be published on "Safety First for Foreigners," which is to be used primarily in teaching foreigners the English language. It will be made up by the "safety first" experts of the Chicago corporation, and each lesson will be a "safety first" idea illustrated by a picture of an accident and how to prevent it.

Walking the tracks, jumping freight trains, hopping engines and crawling under cars, are each coming in for their share, because of their importance to the foreign speaking workingman. "Start them off right," as parents say of their children; and so it is with the foreigner and his sons. They too must be started off right, or off will go their arms, or legs, or lives; and there you have a great loss to the railroads and the producing community as a whole.

Yes, let the public join the railroads in the "safety first" movement. The Y. M. C. A. seems to be preparing to do its part. Will others follow and do their part while the roads are doing their important duty?

A. FLETCHER MARSH,
Secretary, Marsh & Truman Lumber Company.

BAGGAGE CHECK AND CAR NUMBERS.

NEW YORK, October 21, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have read with interest your account published last week, page 728, of the baggage check in use on the Pennsylvania Railroad. The check shown in the illustration is No. 815,003; but as it appears in the engraving, it reads 81-50-03. I am mildly curious to know if you approve this effort of the powerful Pennsylvania Railroad to vitiate the teachings and traditions of all of the arithmetics which have been used in the education of American youth since the Declaration of Independence? Are the baggage men of the Pennsylvania possessed of such limited mentality that they can read "eighty-one," but cannot read "eight hundred and fifteen"?

This calls to remembrance another "grouch" that has agitated my mind; I mean the numbers on freight cars. Cars are now so numerous that numbers of six figures are exceedingly com-

mon, occurring in almost every conductor's report. In lettering the cars most roads go to the extreme opposite of the position taken by the Pennsylvania in its baggage checks. They provide no space whatever. In using, for example, 498061, the figures are run together as closely as they possibly can be. Why should there not be a comma in the middle? Then, again, why hamper the night freight conductor, reading by his dim light, by making the numbers straddle a big diagonal brace or other obstacle? Is he not entitled to have every car number shown as plainly as, for example, the sum of \$498,061 would be shown in a financial statement?

G. F. M.

BASIS FOR TONNAGE RATING COMPUTATIONS.

LOS ANGELES, Cal., October 1, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The results deduced in the interesting article on Tonnage Rating, by Paul M. La Bach, on page 347 of your issue of August 23, show what may be the effect of making computations of economic problems on a basis of general averages. While the conclusions of the American Railway Engineering Association regarding train resistance represented the best investigation and experience at that time, it is unfortunate that no later action has been taken in recognition of the arduous and more extended experimentation which has since been published and which deserves to become the basis of modern computations of economic problems in railway construction. In bulletin No. 43 of the University of Illinois Engineering Experiment Station, Professor Edward C. Schmidt has demonstrated that train resistance varies with the speed and weight of the car, and has given some values based on extended experiments made with the dynamometer car which deserve the respect and recognition of every careful student of railway economics. Since values taken for train resistance are multiplying factors in problems, such as considered in the article above referred to by Mr. La Bach, it appears that more stress should be laid upon its value, as any slight changes may completely alter the results. Mr. La Bach has assumed that "4 lbs. per ton is the train resistance for a 60-ton car for all speeds above three miles per hour." Professor Schmidt proves conclusively that this factor varies from 3.3 lbs. per ton at five miles per hour to 6.0 lbs. per ton at 40 miles per hour, and has a value of 4.0 lbs. per ton at 20 miles per hour.

It has been the contention of those who led the association to adopt the constant train resistance formula, that the weight was the only controlling factor and represents the swing of the pendulum from the old formulas in which weight did not appear at all to one in which nothing but weight controlled. As a matter of fact, it is natural to believe that a scientific determination of such care and accuracy as that given in these later experiments, should show that both of these factors have an influence on the values. The fact that this later data was not available to the committee of the association is sufficient in itself to direct the attention of all students of railway economics to these latest results of scientific investigation. The writer showed the influence of these two factors upon the result in the *Railway Age Gazette* of June 24, 1910, page 1790, and stated that from a mathematical correlation of the variants it appeared that the speed influenced the variation 45 per cent., and the weight 55 per cent. These figures have since been checked by a study of the later statistics given by Professor Schmidt from which it seems that there is every reason to believe that speed and weight have about the same influence upon the train resistance.

Mr. La Bach also uses draw-bar pull computed from the formula which was recommended by the association. The committee was careful to caution that it was always desirable to use draw-bar pull as shown by dynamometer tests rather than computed results. In problems of the nature of those dealt with in the above article it is peculiarly necessary that the two

great factors, train resistance and draw-bar pull, be determined with the utmost accuracy, and therefore any general formulas must give way to actual test results. The writer has demonstrated that the actual tests made with dynamometer cars indicated that the practical draw-bar pull was less than that given by the formula in every test on record. To be accurate in computations these actual draw-bar pull records should be used if the conclusions of the committee are to be followed, as it is their expressed preference.

J. G. VAN ZANDT,
Construction Engineer.

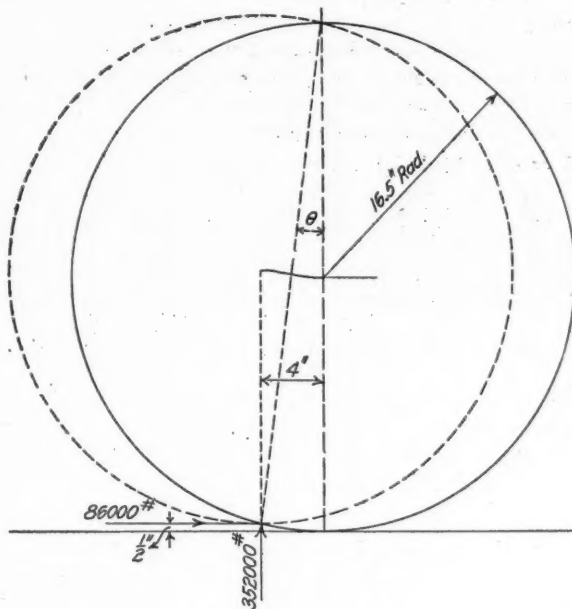
TENDER DERAILMENTS.

BOSTON, Mass., October 29, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I noticed in your issue of September 27, page 569, a communication entitled A Fortunate Wreck. In the course of this communication certain diagrams and computations were given which purported to show the reactions on a wheel striking some assumed obstruction. These reactions were expressed in foot pounds. Now a force cannot be expressed in any such way. In the letter referred to, the energy of a ton load moving at 60 miles an hour was correctly computed and expressed in foot pounds. The reactions on a wheel under assumed certain conditions were then found by a graphical method which I must confess I was unable to follow and agree with, and these reactions were expressed in foot pounds.

It is impossible to express a force in foot pounds, or to re-



Path of Wheel Which Strikes an Obstruction $\frac{1}{2}$ in. High
4 in. from Vertical Line Through Its Center.

duce energy to pounds without introducing a unit of length; for instance, a moving body has a certain amount of energy and is stopped in a certain distance. The energy which it possesses in foot pounds, divided by the distance in feet in which it is stopped, will give the average force exerted during the time of stopping, but to take the energy of a moving body and resolve it into components and then state that these components are reactions, is fundamentally wrong from the standpoint of mechanics.

I was sufficiently interested in the problem to make a solution of the second case spoken of, taking a 33 in. wheel, which apparently is the one used in the article, and having it strike an obstruction 4 in. in advance of the vertical line through its center. If the obstruction is practically unyielding, it will cause the wheel to rise over it. When the center is directly

above the obstruction, the wheel will be moving in a direction parallel to its original direction, in this case, horizontal.

At the instant of contact there will be more or less yielding between the wheel and the obstruction, which will result in its being given a gradually increasing upward motion. I have assumed a path as represented in the accompanying figure. This path consists of two arcs of circles whose radii are easily found by the methods commonly used in computing the radii of cross-over curves. In this case the radii are equal to the radius of the wheel. An obstruction on the track in order to strike a point on a 33 in. wheel, 4 in. in advance of its center, must be 0.47 in. high. Consequently the center of the wheel will be raised in all 0.47 in. while advancing through 4 in. A vertical force necessary to raise the center of the wheel through this distance in the time required for it to traverse 4 in. will evidently be the vertical component of the reaction which we are seeking.

The velocity of the wheel we will assume to be 60 miles an hour, or 88 ft. per second, and the weight to be one ton to agree with Mr. Summers' assumption. The center of the wheel would then move through 4 in. in $1/264$ of a second. We can then use the equation of momentum and impulse, which is that force times time equals the mass acted upon by the force multiplied by the change in its velocity during the time when the force acts. We know all the elements entering into this equation except the force and the vertical velocity. The force is what we seek and the velocity is readily determined from the path by finding the angle θ in the figure. This is $\sin^{-1} \frac{2}{16.5} = .121$. The vertical component is readily determined by multiplying the horizontal by the tangent of θ ; this gives us 88 times .122, or 10.7 ft. per second. The wheel attains this velocity in the time it takes to move 2 in. horizontally, or $1/528$ of a second. Applying the principle of momentum and impulse as stated above, and calling F the required force, $F \times 1/528 = \frac{2000}{32.2} \times 10.7$, or $F = 352,000$ lbs., which equals the vertical component of the force necessary to raise the wheel over this obstruction during the given time. The horizontal component is then readily found to be 86,000 lbs., assuming that the reaction itself acts normally to the surface of the wheel or through its center.

The variation in speed caused by this horizontal force of 86,000 lbs. can be found as follows: The force is variable, increasing from zero to a maximum and decreasing to zero again. If the force be assumed to increase and decrease at a uniform rate, one-half the force multiplied by the distance through which it acts will be the work done on the wheel tending to stop it. $\frac{86000}{2} \times \frac{1}{2} = 14,333$ ft. lbs. When the wheel is on top of the obstruction, its energy will be $240,500 - 14,333 = 226,167$ ft. lbs. The horizontal velocity v , which it will have at this instant, is found as follows: $\frac{1}{2} \times \frac{2000}{32.2} v^2 = 226,167$, from which $v = 85.34$ ft. per second, or 58.3 miles per hour. The velocity of the wheel then will be changed under these assumed conditions from 60 to 58.3 miles per hour. This result will be affected somewhat by the change in the vertical component of the reaction due to the momentary lessening of the velocity; but it will be affected much more by the rotational energy and gyroscopic action of the spinning wheel. The latter elements will, I believe, reduce still more the variation in velocity. A solution taking these elements into account would be too extensive for the present purpose, although such a solution is not too difficult to make.

This solution is chiefly of interest, it seems to me, in showing the tremendous forces to which, under certain circumstances, tracks and running gear may be subjected. It is certainly not at all remarkable that the high rail at a high joint becomes hammered out so rapidly.

As to whether the writer of the letter referred to is correct

in his general reasoning as to the cause of tender derailments, I will not say, but where forces of such magnitude are involved, it seems reasonable to suppose that something might happen. In connection with tender derailments, the writer happens to know that on one road they had a great deal of trouble from such derailments on a certain class of engine. These derailments almost always occurred toward the end of a run when most of the coal had been removed from the forward part of the tender. The whole difficulty was obviated by giving more play to the coupling between the engine and tender. Personally I am of the opinion that it is very possible that lack of play in these couplings together with the location of the coupling pins may have considerable to do with tender derailments which are certainly more frequent than they should be. Very probably the variation in load on the wheels due to the using up of coal and water has an influence as well.

In Mr. Summers' communication on page 783 of the *Railway Age Gazette* of October 25, 1912, he makes the statement that "the excessive rocking of cars throws nearly all of the load on half the springs, compressing them solid." In this connection I wish to call attention to a very prevalent impression with regard to the motion of a train on a track. This impression seems to be that the train rocks, wiggles and weaves its way along in a tortuous path on straight track. The examination of this impression leads to an extremely interesting phase of the question of dynamics. The actual fact of the matter is that the center of gravity of the train and of each car of the train must move in a practically straight line on straight track of a uniform grade. The rocking which is so often noticed is caused by a transverse rotation of the car about its own center of gravity, the center of gravity itself moving in a straight line along the track. The car will rotate, or vibrate, about its gravity axis because its moment of inertia is less about that axis than it is about any other parallel axis. It is started in vibration by the inequalities in the track or wheels. The vibration is damped or stopped by the varying compression on the springs which first stop its rocking and then throw it back in the opposite direction somewhat in the way a pendulum acts. Each car has a definite time of vibration depending upon its own weight and design, and upon the weight and distribution of its lading. When the impulses which it receives are periodic, as in the case of a flat wheel, and further when these periodic vibrations are synchronous with the natural time of vibration of the car, the rocking will increase progressively until the wheels on one side might, in an extreme and rather improbable case, be lifted off the rails. The time of vibration of the springs also enters into this. It is impossible in the space at my command here to go into this subject more in detail, but it is one which is extremely interesting and entirely susceptible of the mathematical treatment. It is also one of increasing practical importance in design. Every practical railroad man knows of locomotives which roll badly at certain speeds. The periodic vibration theory outlined above satisfactorily explains this phenomenon. The force which causes this oscillation is the vertical pressure on the guides. The location of side bearings, so long as they are a reasonable distance apart transversely, ought not to affect the transverse vibrations appreciably.

The whole problem is interesting, but unfortunately I have no data on tenders which are known to be readily susceptible to derailment. If I had I would like to see what I could do with the problem.

LEWIS E. MOORE,

Assistant Professor of Civil Engineering, Massachusetts Institute of Technology.

RAILWAY CONSTRUCTION IN ITALY.—The railway administration will construct a new line from Colle Salvetti to Pontedera, on the railway from Pisa to Florence. With this line the distance from Leghorn to Florence will be reduced by about five miles. The principal object of the new work is to assist the development of Leghorn as a port.

IMPRESSIONS OF BRITISH RAILWAY PRACTICE.

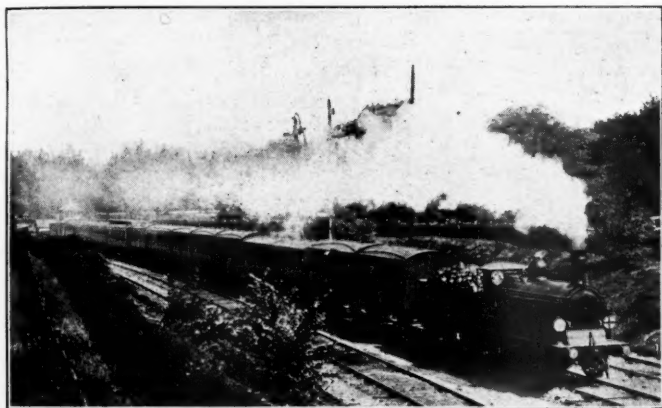
Many Things on the London & North Western at Crewe
Are Worthy of Consideration by American Railway Officers.

BY HENRY W. JACOBS.

The railway shops of the London & North Western at Crewe, England, are probably the largest in the world, employing from 8,000 to 10,000 men. The immense size is due to the great amount of railway material that is manufactured there. For these reasons—size and variety of product—this plant is of unique importance, and is drawn upon here as furnishing such lessons as American mechanical men may learn from British railway practice.

MECHANICAL DEPARTMENT POSITIONS MADE ATTRACTIVE.

It is recognized in England, the land of the birth of the railway, that it is the locomotive rather than the rail that has made

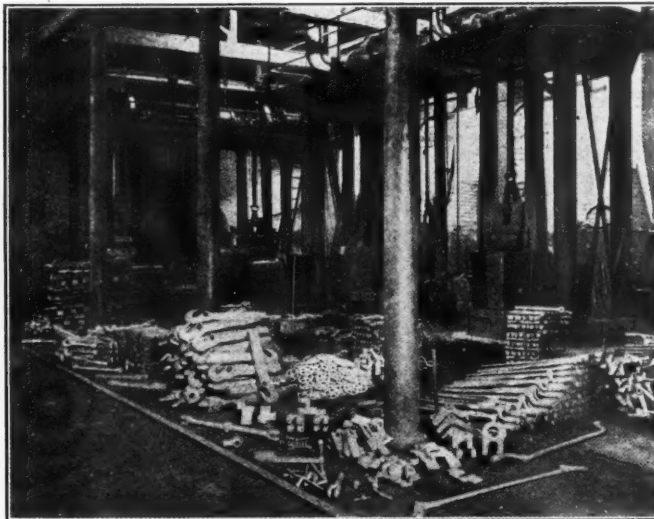


The Brighton Express on the London, Brighton & South Coast.

railroads of such great importance as arteries of traffic. The chief mechanical engineer, as the superintendent of motive power is termed, is therefore given a rank, consideration and authority, which he does not have in United States. He has large discretion as to the policy in matters mechanical and is practically supreme, without interference, in his own department. He is asked to furnish locomotives that shall be a credit to the railroad, and he is encouraged to organize his staff so that the highest technical skill shall be brought to bear in the design of locomotive parts and in the devising of refined running and shop practice. I understand that his compensation is commensurate with his re-

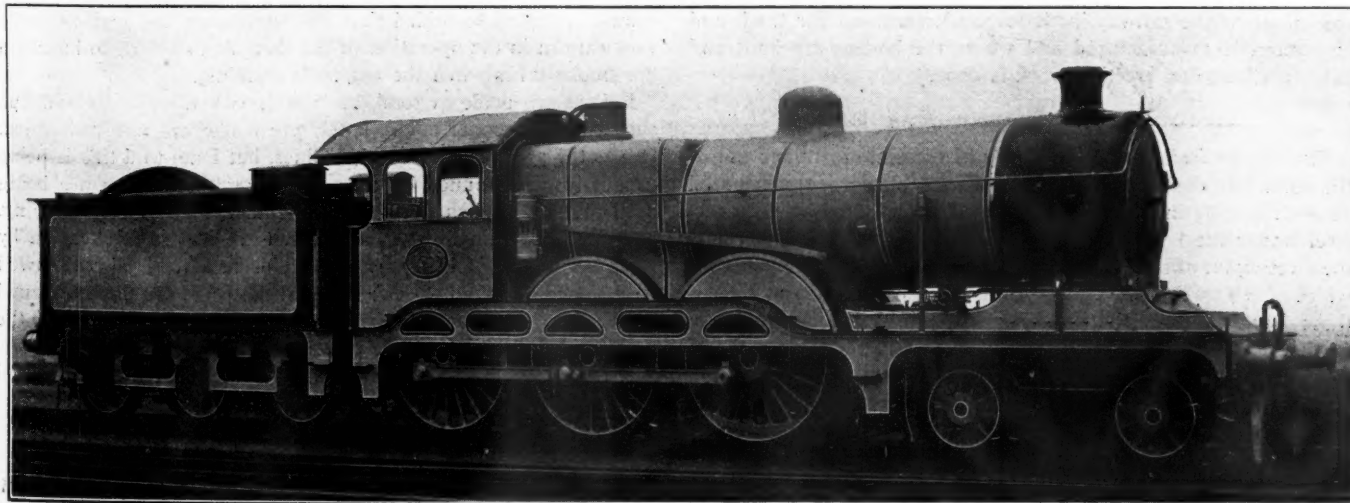
sponsibilities and ranks higher than the salaries paid to the chief mechanical officials of the largest American railways. On the London & North Western the chief mechanical engineer is assisted by two locomotive running superintendents corresponding closely in actual salary, position and duties with our general master mechanics or mechanical superintendents; these in turn have assistants corresponding to master mechanics; a carriage, or passenger car, superintendent; a wagon, or freight car, superintendent; a chief draughtsman, corresponding to our mechanical engineer; a works manager, or shop superintendent; a storekeeper, accountant, etc. All of these officers are located at Crewe, with the exception of the car men whose shops or "works" are at other towns.

The London & North Western, operating about 3,000 miles and



Drop Forge Shop, Showing Some of the Forgings.

having over 3,000 locomotives, 9,000 passenger cars, and 77,000 freight cars, is a strongly centralized road in its administration. The management is what we call departmental, in contrast to divisional. The longest distance between termini, over which this railway runs trains upon its own tracks or upon the tracks of



Special Attention Is Given to the Artistic Appearance of English Locomotives.

connecting lines over which it has "running powers" or trackage rights, does not exceed 400 miles. Most of the traffic is of short haul between dense manufacturing centers and big seaports, the freight service as well as the passenger service being very frequent and rapid. The American slow freight, large volume trains are practically unknown; bridges are not constructed for what we call heavy wheel loads, and long trains cannot be accommodated in the freight yards. The freight cars are of small capacity, ranging from six to twelve long tons, and are carried on four wheels instead of upon two swiveling four wheel trucks as with us. Automatic couplers are not used, although the wheels of all vehicles are steel-tired and have either cast steel or wrought iron centers.

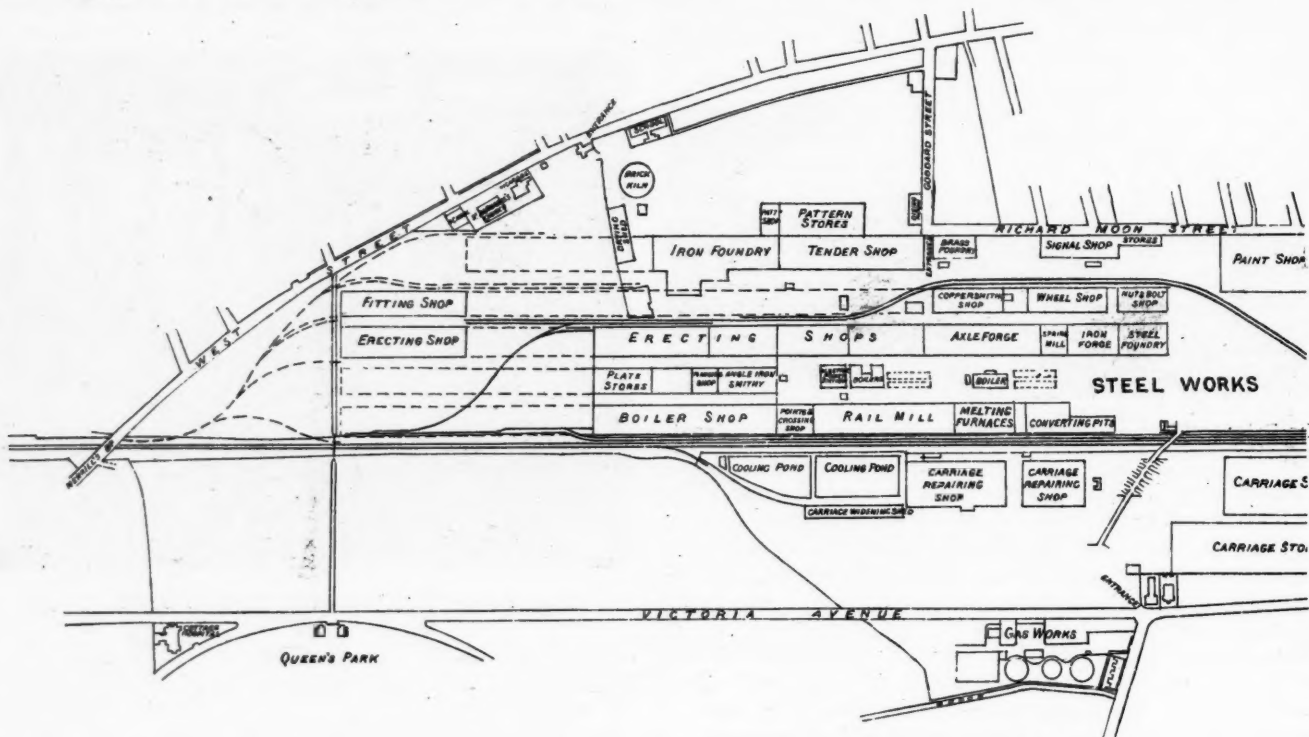
So much for the general characteristics of the traffic for which the Crewe works are required to build and maintain the locomotives. These works extend in a narrow strip parallel to the London & North Western for a distance of about 3 miles, covering perhaps 200 acres. They consist of the "Old Works" whose name is descriptive and which was a complete locomotive building and repair plant; and the "Steel Works" where all of the

forged in one piece out of the solid block, but in later years it had been found better to follow the built up practice. I observed an additional journal bearing placed between the two inside cranks on several of the large engines, this journal being supported by a longitudinal frame member bolted to two of the heavy transverse frame braces. This avoids any serious damage should the crank axle break.

The inside cylinders are often inclined and are fitted with slide valves, a brass metal and special composition being used for the slide; piston valves are also used on other engines. Modern express locomotives that were in the process of building had four simple cylinders of the same diameter, two of them being outside the frames and each cylinder having its own piston valve. The piston valves are about 7 in. in diameter and are always used on the superheater locomotives.

SUPERHEATERS ARE USED EXTENSIVELY.

Over 200 superheater locomotives of the Schmidt type are in service and are giving satisfaction both in fuel economy and in maintenance, very little trouble being encountered with leaky



General Arrangement of the London & North Western Shops at Crewe, England.

steel used by the railway, both for equipment and for track and structures, is manufactured and where the boilers are built and much machine and erecting work is done.

LOCOMOTIVE FRAMES ARE OF SLAB FORM.

Locomotive frames are universally of the plate form and not of the solid bar design that we use. These plates are substantial deep girders, $\frac{3}{4}$ in. to 1 in. thick, heavily reinforced by deep cast steel transverse braces. The frame jaws are also reinforced by the riveting on of an extra plate and I was struck by the generous width of the shoe faces, although the axle loads are about half of those found in American practice. I was told that no trouble is experienced with the breaking of frames. The advantages, therefore, of the plate construction seem to be greater strength for a less weight of frame and the elimination of breakages. It would appear from the trouble found in America with frame breakage that it would be worth while to experiment with plate frames which have been found so successful in British railroad practice. Further, in most cases, all of the engines that we saw were of the inside crank type. I was told that these inside cranks used to be

joints. It must be added that the enginemen are trained to be very careful in the operation of the damper so as not to burn out the smoke tubes when the engine is standing.

Boilers are made of steel, but the fireboxes, staybolts and flue sheets are of copper. The latter when new are one inch thick. It was the practice to use copper flues, but I am told this is being gradually discontinued on new power and steel flues are being used instead. When flues are safe-ended it is done by brazing, and not by welding. The ends which are brazed are scarfed by machine instead of being swaged. This practice is also followed with the copper flues. Back heads of steel had the flanges turned outward to the rear, the rivet heads thus being outside of the boiler. A calking strip was placed between the back head flange and the shell. The front flue sheet of steel extends downward like a throat sheet, and is bolted to the cylinder castings.

MANY DROP FORGINGS ARE USED.

Noteworthy is the extensive use made of mild steel drop forgings. These are beautifully made, requiring very little material to be removed in subsequent machine operations. This process

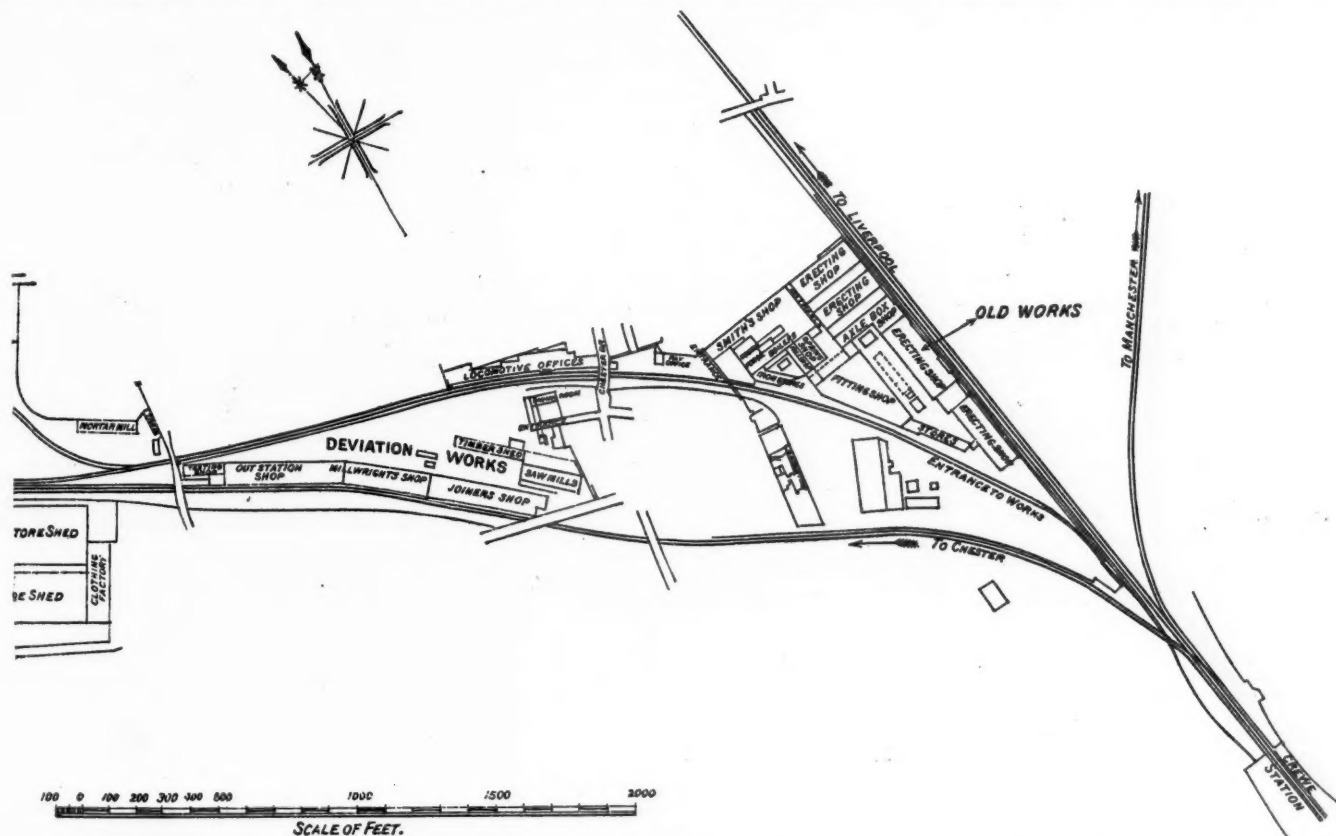
gives a better and more uniform quality of material than the usual open fire hand forging, or cast steel parts used in America. Hangers of all kinds, are made by this method and also pistons which require to be machined only for the rod fit, the cylinder fit, and the piston ring grooves. These pistons are much lighter than the heavy, hollow, cast iron ones used in America, their section being of an I shape. Of course the cylinder heads are shaped so as to give a minimum clearance.

In examining the detail workmanship it was found that greater care was exercised in doing the work than in the States. Not alone in doing the machine and fitting work, but from the very beginning of the forging itself the various steel plates and metals that go into the construction of the locomotives are carefully inspected and tested. After they are forged into their respective shapes they are carefully annealed to eliminate any internal structural strains, and in some special cases they are hardened and oil treated in addition. This heat treatment is carried to a much greater extent than is the case with us. I understood that owing

takes the place of our headlight. The result is that a British locomotive has most pleasing and simple lines and attracts the attention of passengers at stations. It may be said to have architectural beauty instead of being undisguisedly a black, greasy machine. I believe that if American railroads would profit by the British example in making a locomotive of more pleasing appearance and lines, as we already do with regard to the outside appearance of our limited trains, such a move could not help but have a favorable effect upon the public without much increasing the expense or interfering with the facility of getting at working parts.

RAILROAD MANUFACTURES MOST EVERYTHING IT USES.

Manufacturing of all kinds of material used by the railway is done on a surprising scale at Crewe. The population of the town consists almost solely of the families of men employed in the railway shops and service and is about 42,000. As examples of the extent and variety of these manufactures the following may be mentioned: Rivets, steel plates, rails and structural shapes;



General Arrangement of the London & North Western Shops at Crewe, England.

to the care exercised in the heat treatment and testing of these side rods it is rare to have an engine failure due to broken side or connecting rods, or other motion work.

SPECIAL ATTENTION GIVEN TO LOCOMOTIVE APPEARANCE.

Even the casual traveler is much impressed by the beautiful appearance of a British locomotive. The painting of these locomotives is almost a fine art, fourteen coats of filler, paint and varnish being applied to the jacket, cab, tender and wheel covers. Such a painting is said to last from five to seven years, locomotives not being repainted at every shopping. Beneath the jacket is a thin blanket of asbestos fabric with an air space of about two inches next to the boiler shell. In this space are located injector pipes, etc., these being entirely out of sight. Sanding is done by gravity from boxes hung beneath the run bearers, and not from a central sand dome located on the boiler top. There is, therefore, on the top of a British locomotive only the one steam dome, or at most this dome supplemented by a small pop and whistle dome. No bell is carried and a small signal light

steel, malleable, gray iron, brass, and special metal castings; galvanized iron ware, injectors and all small cab fittings, arch and fire brick, common brick for buildings and pavements, tiling and terra cotta ware for all purposes, pottery, stone for masonry paving, and even grindstones. Most of the small hand tools and even the machines used in the works are made by the railroad, including tool steel, twist drills, big hydraulic presses, planers, etc. Many ingenious jigs and devices are also used, detailed thought having been exercised in reducing labor costs to a minimum. There was, for instance, a multiple spindle drill for flue sheets; a template was used, thus not only doing the work rapidly because of the several spindles, but also avoiding the laying off of each separate sheet. Small brass work, such as couplings, which with us are usually chucked in a lathe, one at a time, are here done several at a time with a multiple drill. A large American railway shop could profit greatly in the refinement and cheapening of its manufacturing methods by a close and detailed study of the methods that have been developed at Crewe.

Not only does the company manufacture practically everything

used in its business, to the extent of having no scrap for sale, but it also carries on in connection with its shops and the town of Crewe the activities of manufacturing gas, maintains the entire water supply, and builds and rents 1,000 houses and cottages in the neighborhood to workmen. Houses are even provided for the various officials, very much as is done for families of officers at a military barracks, although I am informed that a rental is charged for the occupancy of these official residences. The residences are so placed that they bring these officers in close vicinity to the works and offices.

EFFICIENT TEST DEPARTMENT.

Having in my active railroad career been in favor of a good test department organization, because of its influence in the selection of good materials entering into railroad equipment and construction, I was much interested in the organization for these purposes maintained by the London & North Western. In its test laboratory about 40 men work in two shifts and test all manner of material, such as samples from each tire heat, from each rail bloom, spring material, and in fact all of the metals and even stones and cement which are used on a railway.

In addition to these men, who worked in a beautifully appointed laboratory equipped with all kinds of testing machines—many of them built at the shops—there were other men to the number of about 20 making mechanical tests and inspection of other materials at other places on the railway. This did not include the timber inspectors, who are practical rather than technical men. For a railway as short as the London & North Western a test and inspection organization of some 60 men is a goodly number, and indicates the great importance rightly attached by the British to the most careful selection of materials entering into railroad use. As a result instances of rail breakage, chipped flanges of wheels, and failure of locomotive parts are conspicuously rare.

Those railways that have instituted similar test and inspection departments on a sufficiently large scale in the United States, and have provided these departments with adequate facilities are unquestionably upon the right track, and will render invaluable service in improving the performance of our physical equipment and structures.

THE AUTOMATIC FLAGMAN.

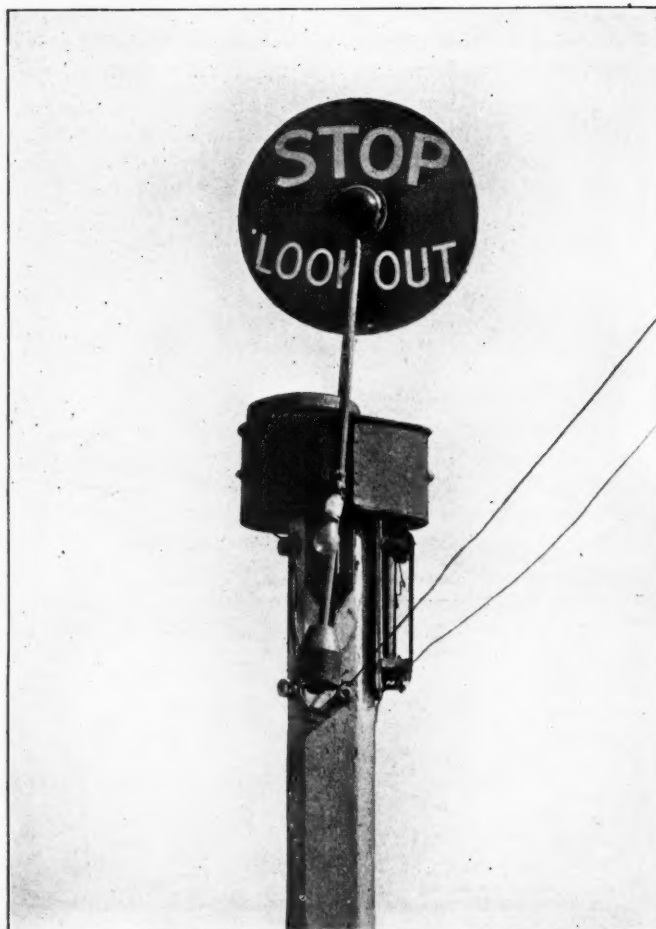
The audible and visual highway crossing signal shown in the accompanying illustration is called the "automatic flagman," and two of them are in use on an electric suburban line of the Southern Pacific in Berkeley, Cal.

The circular disk bearing the words "STOP, LOOKOUT" is hollow, and the 4-in. lens in its center, behind which is an electric light, is red. A similar lens is fixed in the opposite side so that the signal shows both ways. This disk is supported by two rocker arms which have counter-weights below their center, and when a train is approaching, the arms, with the disk, vibrate at the rate of about 30 times a minute, the motion being imparted by an electric motor which is run by a direct current of 220 volts, at a maximum speed of 1,500 r. p. m. The motor imparts motion to the rocker arms through a worm gear. Near the axis of the machine will be seen another electric light of 16 c. p., which is white; and there is a corresponding light on the farther side of the post, not visible in the engraving. In series with the lamps and the motor are resistance coils, the voltage of 220 being reduced from 550.

On the top of the box containing the motor is a 12-in. gong. On the approach of a train the gong is started ringing and the motor is put in motion by the closing of a contact on the trolley wire which consists of a metallic brush placed just above the wire so as to take current from the power conductor and convey it to the relay which controls the apparatus. These brushes are about 16 in. long. The current sent to the signal

on the approach of a car energizes a relay to close the bell circuit, and at the same time a connection is made to another brush which de-energizes the signal after the car has passed over the crossing. After making these connections the energizing circuit is itself immediately broken, so that there is never any arc between the trolley wheel and the contact brush. On a steam railway the signal would be started and stopped by the usual means in use on such roads.

Over 50 of these signals are in use on the lines of the Pacific Electric Railway in and near Los Angeles, and there are also several on the Atchison, Topeka & Santa Fe. Mr. Roome, superintendent of signals of the Pacific Electric Railway, in whose shops the signals have been made, informs us that at a part of the crossings on his lines the signals have to work 700 times a



A Moving Highway Crossing Signal.

day, and in some cases one of these signals has shown a record of three months without a single failure.

The proprietor of this signal is the Automatic Flagman Company, Los Angeles, Cal.

BRITISH DEMAND FOR CARS.—One of the best indications of the state of trade is to be found in the demand for freight cars and at present it is an exceptionally strong one. Many builders are fully booked up and cannot promise delivery of new cars within six months. During the last three years prices have advanced very considerably, and present quotations are \$370 for ten-ton cars and \$414 for 12-ton cars, with side, end and bottom doors. These prices are about \$68 higher than those in force three years ago, and are due to the increased costs of timber, iron, and steel, and also the extra requirements under the latest regulations of the railway clearing house, possibly the chief of which is that there shall be brake handles on each side.—*Manchester Guardian*.

AGRICULTURAL PROMOTION WORK OF THE RAILWAYS.*

Its Character and Importance Are Evident from Statistics
Which Have Been Gathered and Compiled by the Government.

By FRANK ANDREWS,

Assistant Chief, Division of Production and Distribution, U. S. Department of Agriculture.

Improvement of agriculture is a matter of public importance in a country like the United States, which depends for a large part of its annual production of wealth on the product of the farm. The large sums expended by the Federal and state governments for agricultural experiments and for spreading abroad information as to methods of farming are not to be regarded as contributions for the relief of a needy class of people, but rather for the further development of one of the most important industries of the nation. That these appropriations rest upon a sound economic basis is indicated by the voluntary efforts that are put forth for the development of agriculture by individuals and corporations engaged in nonagricultural occupations.

MOTIVES OF RAILROAD COMPANIES.

The most prominent of all classes of occupations which have aided agriculture is that of transportation. The railroad companies are now making, and for a number of years have made, special efforts, apart from their strictly transportation business, to promote agriculture. There have been at least two strong motives for the railroad companies to do this. One motive has been and is the large percentage of the revenue which is due to the farm. During the year ending June 30, 1910, the revenue from four classes of farm products, grain, hay, cotton, and live stock, amounted to \$97,000,000 on those roads for which reports on this subject were made to the Interstate Commerce Commission; they operated more than one-half the mileage of the United States, and carried about one-half of the total tonnage. With the data for these companies as a basis, it is estimated that 10 per cent. of the total freight revenue of the railroads of the country came from carrying grain, hay, cotton and live stock.

This percentage represents a little more than one-half of the total farm produce carried by rail. If the other half, for which no revenue statistics are now available, yielded the same rate of return, the total amount received by the railroads of the United States during the year ending June 30, 1910, for carrying products of the farm would equal 20 per cent. of the total freight revenue.

A second reason why railroad companies have been willing to spend money to encourage agriculture has been the fact that they had for sale large areas of land. The total area of public land granted by acts of Congress for railroad purposes up to June 30, 1911, was 115,500,000 acres, which is equal to more than the total land area of the seven Atlantic states from New York to Virginia, inclusive. One railroad was granted 33,300,000 acres. Another company had received 19,100,000 acres up to that date.

More than 60 years have elapsed since the first grant, and during that time railroad companies have been vitally interested in increasing the number of farmers on the lands along their lines. One of the first departments organized in some of the western railroad companies was the land department, which had charge of selling the company's lands to individuals.

While a large area is still owned by railroad companies west of the Mississippi, it is not advertised as farming land to a great extent, at least not nearly so much as the same companies through their immigration departments advertise farming lands, owned by others, and offered for sale, in the regions traversed by the railroad. The efforts of the railroads to settle their respective territory are now directed chiefly to lands other than those owned by the railroad companies. However, some railroad agricultural land is still on the market, and the sales mentioned below may include some new farms.

One railroad company reported for the year ending June 30, 1909, the sale of 184,069 acres at an average price of \$2.17 an

acre. Another company for the same year reported the sale of 349,961 acres. Still another reported for that year 80,464 acres at an average price of \$3.75 an acre. All three of these companies had considerable areas still unsold, a large part of which is reported as not suited to farming.

Another important source of supply of farm land to which new settlers were invited was the land subject to "homestead entry," the undeveloped lands offered by the United States to persons who would take them as homes. Up to June 30, 1911, the conditions of entry had been fulfilled and final title received to 123,500,000 acres, which had been granted under the homestead act during the 43 years since it was passed. The area to which title was acquired during the year ending June 30, 1911, amounted to 7,700,000 acres.

From soliciting agricultural settlers it is a natural sequence to offer them advice and co-operation; and in some railroad companies the agricultural education department and the immigration department are united. The educational work, however, is newer, having come into vogue largely within the past decade.

On account of the great extent of the agricultural promotion work of the railroads in soliciting new settlers and in encouraging the use of better farming methods, the influence of railroad companies plays an important part in the present-day movement for better farming. The work is carried on, the companies themselves assert, as a business proposition. The more farmers along a road the more the tonnage; their products are to be hauled away and their supplies brought to them. Freight traffic is increased through better methods of agriculture. Passenger traffic also derives a benefit from increases in population.

Most of the lines of work undertaken by railroad companies for the promotion of agriculture may be divided into two general classes. The first of these classes consists of efforts to increase the number of farmers in the regions along the railroads concerned; while the second class of work may be called educational and looks to an increase in the production of farms already established.

One or both of these two kinds of work are usually undertaken by any railroad company making special efforts to promote agriculture, and for this reason these two classes of activities are the only ones considered in Tables 1 to 4. Such projects as those relating to the increase of available farm lands, the supply of farm labor, and the establishment or improvement of markets and marketing systems are offered by railroads, which also engage either in "immigration" or agricultural education work, or in both. Hence a list of companies engaged in these minor activities would contain no companies in addition to the ones represented in the tables just mentioned.

EXTENT OF AGRICULTURAL PROMOTION WORK.

A satisfactory way to measure the relative extent of the agricultural promotion work of different railroads is in many cases hard, if not impracticable, to determine. The agricultural instruction trains of one railroad may reach more persons than do those of a second railroad, but the experimental plots of the second may outnumber the plots of the first company, and so on through the list of agricultural promotion projects. A common measure for all kinds of projects is not practicable. When two or more railroad companies have active agricultural departments, each engaged in a variety of projects, it is hard, if not impossible, to determine which company is making the greatest efforts.

In want of a more satisfactory way to compare the relative importance of efforts or results of various railroads, the bases used in tables 1 to 4, inclusive, were taken.

*Abstracted from Bulletin No. 100 of the Bureau of Statistics, United States Department of Agriculture.

In Table 1 the mileage operated by all railroads is compared with that operated by those making any special efforts at all in either of the two chief lines of work covered by the table. On this basis the road doing much work counts just as much, in proportion to mileage, as the road doing very little agricultural promotion work.

The importance of this apparent defect in the table is lessened by the fact that each territorial division, shown in Table 1, includes some roads that are doing much work and some that are doing but little. Hence, for purposes of a rough comparison, it may be assumed that each territorial group represented in the table has about the same proportion of roads that are doing much and of roads that are doing little in their organized efforts to improve farming.

The same assumption may be made in comparing one geographic division of states with another, in Tables 2, 3 and 4.

Taken at their least significance, these four tables show to what extent a beginning, if nothing more, has been made in some line of railroad agricultural promotion work.

More than three-fourths of the mileage of the railroads in the United States is operated by companies which, in the year ending June 30, 1912, were making organized efforts to promote agriculture. The companies working to secure new agricultural settlers along their lines operated nearly 62 per cent. of the railroad mileage of the country, while those companies which engaged in promoting agricultural education operated about 70 per cent. In

parison is for Group VIII, which comprises Kansas, Oklahoma, Arkansas, and parts of Missouri and Colorado.

For "immigration" work, consisting in efforts to bring more farmers into territory served by the roads doing the work, the percentages of mileage ranged from 7 to 89 per cent. The low figure refers to Group II, including nearly all the area of the Middle Atlantic states from New York to Maryland, inclusive; while the highest percentage applies to Group VII, which consists of Nebraska, Wyoming, Montana, and parts of the Dakotas.

The figures for mileage, as will be noted in note 1, Table 1, refer to June 30, 1910, while the classification of railroads in that table depends upon promotion work that was reported to be in progress in the 12 months ending June 30, 1912. As the mileage is subject to relatively slight changes from year to year, the data in this table may be taken to refer to conditions existing in 1911-12.

TOTAL LAND AREA AFFECTED.

An attempt to measure the extent of railroad promotion work in agriculture is made also in Tables 2, 3 and 4. In these tables statistics for individual counties form the basis. A county through which runs a railroad engaged in organized efforts for agricultural promotion may be regarded for the purpose of this comparison as subject to the influence of such efforts. In many such countries, two, three or more railroads were engaged in the work under discussion. In some instances, more especially those of agricultural settlement work, the efforts of the railroads were not directed to all counties along their respective lines. For instance, a railroad extending 1,000 miles or more might confine its efforts for agricultural settlement to newer localities, paying but little attention to the older and more established farming sections, where farm values are high.

In some geographic divisions, notably west of the Missouri river and in the South Central states, the settlement, or "immigration" work, extended into most all the counties reached by the railroads which were doing such work. In the North Atlantic division, the North Central east of the Mississippi river, and, as has been noted, in a considerable part of the North Central division west of the Mississippi river, only certain sections are subject to the efforts to increase the farming population. But it is also to be noted that the "immigration" efforts of railroads are being rapidly extended to include many of the older agricultural regions. A large part of the New England states and of New York, parts of Maryland, and a large number of counties in Michigan are advertised by railroads and by organizations aided by railroads, for the purpose of bringing in more farmers.

With agricultural education work, on the other hand, the activity of a road is apt to even be more generally distributed and to include practically every county on the line.

The 155,000 miles operated by companies making organized efforts to bring more farmers to their territory are located in counties whose land area is 1,585,000 acres, or 83 per cent. of the total land area of continental United States, and the 174,000 miles concerned in the promotion of agricultural education serve counties whose total land area equals 1,643,000,000 acres, or 86 per cent. of the total.

Railroads engaged in any systematic agricultural promotion work operated 191,000 miles and entered counties whose land area was 1,697,000 acres, or 89 per cent. of the land area of the entire country (excluding Alaska and the island possessions). Details for the geographic divisions appear in Table 2.

Lines of work not belonging strictly to either of these principal classes include, among other things, efforts to increase the area of farm land, to assist in supplying farm laborers, and to establish markets. Railroads undertaking one or more of these minor branches of development work are also generally engaged in soliciting new settlers, in agricultural education, or in both. Complete information of the development work of all railroads represented in Tables 1 to 4, inclusive, is not available, so it is not possible to show the extent of each minor phase or subdivision of the movement. The data for the two general

TABLE 1.—MILEAGE OPERATED BY RAILROADS MAKING ORGANIZED EFFORTS TO PROMOTE AGRICULTURE.¹

Group.	Total miles operated.	Miles operated by railroads making organized efforts to—					
		Increase the number of farmers.		Promote agricultural education.		Increase the number of farmers or promote agricultural education.	
		Miles.	Per cent of total.	Miles.	Per cent of total.	Miles.	Per cent of total.
I.....	8,240	5,655	68.6	6,906	83.8	6,906	83.8
II.....	24,321	1,733	7.1	16,947	69.1	16,947	69.1
III.....	26,624	6,997	26.3	15,490	58.2	15,490	58.2
IV.....	15,221	10,746	70.6	10,955	72.0	10,955	72.0
V.....	30,076	28,664	95.3	22,837	76.0	23,838	79.3
VI.....	52,370	32,080	61.2	30,396	58.0	41,572	79.4
VII.....	14,099	12,525	88.8	11,466	81.3	12,525	88.8
VIII.....	34,653	29,403	84.8	30,440	87.8	30,505	88.9
IX.....	19,405	14,067	72.5	11,615	59.9	14,766	76.1
X.....	24,774	17,684	71.2	17,072	68.9	17,634	71.2
United States.....	249,992	154,504	61.8	174,156	69.7	191,448	76.6

¹ Compiled from reports of the Interstate Commerce Commission on Statistics of Railways in the United States. Figures refer to June 30, 1910, and railroads are classified according to the agricultural promotion work that was reported to be in progress in the year ending June 30, 1912.

spite of the thorough inquiry made in preparing this bulletin, data for some railroads may have been omitted from the totals upon which these percentages were computed. The inclusion of such data would, of course, increase the figures upon which the percentages depend, but it is not at all probable that any material increases would be made in the percentages as given above and in Table 1.

To compare one part of the United States with another, as to the mileage operated, the territorial groups as defined by the Interstate Commerce Commission have been taken as a basis.

It will be noted in Table I that in Group III 58.2 per cent. of the total mileage of railroads was operated by companies engaged in some form of agricultural promotion, while in Group VIII the percentage was 88.9. Between these two extremes are the percentages for each of the other eight groups.

Educational work was conducted in practically all parts of the United States, more than one-half of the mileage of each territorial group was operated by companies making special efforts to introduce better methods in farming. The smallest percentage of mileage involved in agricultural education was in Group III, including the region extending from western New York and Pennsylvania to the eastern boundary of Illinois, and from the Ohio river to the Straits of Mackinac. But even in this region the railroads engaged in agricultural education operated more than 15,000 miles of line, or over 58 per cent. of the total mileage for that territorial group. The highest percentage in this com-

classes, soliciting settlers and promoting education, however, show approximately the extent of the work.

AREA OF FARMS.

The fraction of agricultural land subject to the influence of the railroad promotion work is indicated in Table 3. Of the 879,000,000 acres in all farms, 738,000,000 acres, or 84 per cent., was in counties having railroads engaged in soliciting agricultural settlers, while the farm area in counties subject to the agricultural education work of railroads was somewhat greater, being nearly 801,000,000 acres, or over 91 per cent. of the total. The figures refer to 1910, while the counties are classified ac-

TABLE 2.—TOTAL LAND AREA IN COUNTIES CONTAINING RAILROADS ENGAGED IN ORGANIZED EFFORTS TO PROMOTE AGRICULTURE.¹

Geographic division	Total land area.	Counties in which were located railroads engaged in organized efforts to—					
		Increase the number of farmers.		Promote agricultural education.		Increase the number of farmers or promote agricultural education.	
		Land area.	Per cent of total.	Land area.	Per cent of total.	Land area.	Per cent of total.
North Atlantic.....	103,664,640	65,827,200	63.5	101,061,700	97.5	101,061,700	97.5
South Atlantic.....	172,206,440	142,821,760	82.9	159,847,040	92.8	159,847,040	92.8
North Central:							
East of Mississippi River.....	157,100,960	101,799,040	64.8	138,483,840	88.1	148,799,360	94.7
West of Mississippi River.....	326,914,560	307,308,746	94.0	290,467,840	88.9	309,048,480	94.5
South Central:							
East of Mississippi River.....	114,885,760	103,104,640	89.7	100,571,520	87.5	103,104,640	89.7
West of Mississippi River.....	275,037,440	231,653,120	84.2	233,021,440	84.7	238,791,680	86.8
Rocky Mountain.....	540,840,000	459,297,280	84.9	446,149,120	82.5	465,020,160	86.0
Pacific Coast.....	203,580,800	173,210,240	85.1	173,210,240	85.1	173,210,240	85.1
United States.....	1,903,289,600	1,585,017,026	83.3	1,642,812,800	86.3	1,607,020,960	84.5

¹ The figures in this table are based upon the census of 1910; and the counties are grouped according to the railroad's agricultural promotion work that was reported to be in progress in the year ending June 30, 1912.

cording to the railroad's agricultural promotion that was being carried on in the year ending June 30, 1912. The changes in acreage from 1910 to 1912, it may be safely assumed, were not enough to change materially the figures in Table 3, so that the data may be taken to refer practically to the year ending June 30, 1912. The same is true of Tables 2 and 4.

By geographic divisions, the highest percentage of farm land subject to railroad settlement schemes was in the North Central states lying west of the Mississippi river. In this division more than 97 per cent. of the total farm acreage lay in coun-

TABLE 3.—AREA OF FARMS IN COUNTIES CONTAINING RAILROADS ENGAGED IN ORGANIZED EFFORTS TO PROMOTE AGRICULTURE.¹

Geographic division	Total area of farms.	Counties in which were located railroads engaged in organized efforts to—					
		Increase the number of farmers.		Promote agricultural education.		Increase the number of farmers or promote agricultural education.	
		Area of farms.	Per cent of total.	Area of farms.	Per cent of total.	Area of farms.	Per cent of total.
North Atlantic.....	62,905,987	41,517,521	66.0	61,865,514	97.6	61,865,514	97.6
South Atlantic.....	103,782,275	84,619,854	81.5	97,991,026	94.4	98,084,634	94.5
North Central:							
East of Mississippi River.....	117,920,148	69,245,964	58.7	109,056,645	92.5	112,635,972	95.5
West of Mississippi River.....	232,648,121	226,340,025	97.3	215,740,976	92.7	227,021,608	97.6
South Central:							
East of Mississippi River.....	81,520,629	72,198,223	88.6	70,094,849	86.7	72,198,223	88.6
West of Mississippi River.....	169,149,976	141,944,230	83.9	143,533,760	84.9	145,638,283	86.1
Rocky Mountain.....	59,383,420	54,616,096	91.7	55,100,261	92.6	55,865,391	94.2
Pacific Coast.....	51,328,789	47,413,824	92.4	47,413,824	92.4	47,413,824	92.4
United States.....	878,798,345	737,896,087	84.0	800,916,864	91.1	810,722,451	92.3

¹ The figures in this table are based upon the census of 1910; and the counties are grouped according to the railroad's agricultural promotion work that was reported to be in progress in the year ending June 30, 1912.

ties reached by railroads engaged in this work. It should be understood, however, that these railroads were apparently not making much, if any, effort to induce people to migrate to the more highly developed farming sections in the eastern and

southeastern parts of this division, for instance, in Iowa. A highly developed, thickly settled farming region is not usually taken as the object of "immigration" or "colonization" movements. The next geographic division in order of importance in the railroad settlement work is composed of the three states on the Pacific coast, where 92 per cent. of the farm land was reached by railroads engaged in this work; and next in order came the Rocky mountain states, where the percentage was nearly 92. The least percentage reported for any geographic division was for the North Central states east of the Mississippi river, and even here nearly three-fifths of the farm land was in counties served by railroads engaged in promoting agricultural settlement.

The area of farm land subject to the agricultural education work of railroads ranged from about 98 per cent. in the North Atlantic division to nearly 85 per cent. in the South Central division west of the Mississippi river. In the South Central division east of the Mississippi river the percentage was nearly 87, and in the remaining five divisions the percentage for each exceeded 92.

Of the entire area of farm land in continental United States, 811,000,000 acres, or 92 per cent., was in counties served by railroads which were engaged in some form of organized agricultural promotion, according to Table 3.

NUMBER OF FARMS AFFECTED.

The extent of the agricultural promotion efforts of railroads is illustrated further by the percentage of the number of farms in the counties having railroads engaged in this work. This is shown in Table 4. Comparing this table with Table 3,

TABLE 4.—NUMBER OF FARMS IN COUNTIES CONTAINING RAILROADS ENGAGED IN ORGANIZED EFFORTS TO PROMOTE AGRICULTURE.¹

Geographic division	Total number of farms.	Counties in which were located railroads engaged in organized efforts to—					
		Increase the number of farmers.		Promote agricultural education.		Increase the number of farmers or promote agricultural education.	
		Number of farms.	Per cent of total.	Number of farms.	Per cent of total.	Number of farms.	Per cent of total.
North Atlantic.....	657,181	422,788	64.3	638,499	97.2	638,470	97.2
South Atlantic.....	1,111,881	924,626	83.2	1,059,571	95.3	1,060,659	95.4
North Central:							
East of Mississippi River.....	1,123,489	650,410	57.9	1,044,905	93.0	1,074,567	95.6
West of Mississippi River.....	1,109,948	1,067,006	97.9	1,050,426	94.6	1,060,336	96.2
South Central:							
East of Mississippi River.....	1,042,480	926,614	89.9	920,360	88.3	926,914	89.9
West of Mississippi River.....	943,156	899,460	95.4	895,349	94.9	907,801	96.2
Rocky Mountain.....	183,446	165,075	90.0	165,556	90.2	166,681	92.0
Pacific coast.....	180,891	170,499	94.5	170,499	94.5	170,499	94.5
United States.....	6,361,502	5,265,874	82.8	5,954,135	93.6	6,056,947	95.2

¹ The figures in this table are based upon the census of 1910; and the counties are grouped according to the railroad's agricultural promotion work that was reported to be in progress in the year ending June 30, 1912.

showing the area of farms, the greatest variation in percentages applying to a geographic division is for the South Central states west of the Mississippi river.

The percentage, in this division, of individual farms in counties containing railroads making organized efforts to increase the number of farms, was 95, while the corresponding percentage of area was only about 84 per cent. This shows that the work was most extensive where farms were most numerous; only 5 per cent. of the individual farms lay outside of the counties having this class of railroads, while 16 per cent. of the total farm area was in counties not reported to be subject to such work in this geographic division. A similar contrast exists in regard to the same division for counties sharing in the educational work of railroads. Here 5 per cent. of the individual farms were reported to be in counties not reached by these educational efforts. These counties contained 15 per cent. of the total farm area,

The entire number of farms in counties subject to the agricultural promotion work of railroads was over 6,000,000, or 95 per cent. of the total. In other words, only 5 per cent. of the individual farms of this country in 1911-12 were not lo-

cated, at least nominally, within reach of the immigration or educational efforts of railroad companies in behalf of agriculture.

An attempt has been made to secure as complete a list as practicable of all railroad companies engaged in special efforts to promote agriculture, in the year ending June 30, 1912. Through personal inquiry and correspondence, a list of 152 has been compiled. A number of letters making inquiries as to agricultural promotion work were not answered, but in most of these cases it is believed that no agricultural promotion work was done by the railroad companies to which the letters were addressed.

GAS-ELECTRIC CARS FOR THE MISSOURI, OKLAHOMA & GULF.

The Missouri, Oklahoma & Gulf has adopted the "Dracar" as the type of gas-electric car to be used on its lines. This car is designed and supplied by the Drake Railway Automotrice Company of Chicago and Paris, and is the prototype of that built by the French Westinghouse Company in Europe. This is the first installation of this car in the United States, and while the general principle of the system is the same as that used by the General Electric Company, there are numerous differences in the details of construction. There are 80 to 100 of these cars in service in Europe. Their operation on the Arad Csanad Railway in Hungary, on which they have been in service for 7 years, was compared with steam cars operating on the same road in a paper on Self Propelled Cars, presented before the recent convention of the American Electric Railway Engineering Association. The following table is taken from that paper:

COST OF OPERATION ON ARAD CSANAD RAILWAY (CENTS PER CAR MILE).

Year.	Mileage.	Staff.	Fuel.	Lubrication.	Miscellaneous.	Cleaning, etc.	Repairs.	Taxes.	Total.
1905.....	192,000	2.18	2.34	0.38	0.74	0.06	1.70	4.30	11.70
1906.....	670,000	2.50	2.86	0.80	0.32	0.10	1.74	4.44	12.76
1907.....	895,000	2.86	3.38	0.64	0.36	0.16	2.32	4.68	14.40
1908.....	920,000	3.26	4.00	0.54	0.78	0.14	2.50	4.90	15.52
1909.....	881,000	3.26	3.26	0.54	0.76	0.20	2.78	5.70	16.50
STEAM TRAINS FOR COMPARISON WITH ABOVE.									
1906.....	244,000	7.40	7.32	0.56	0.88	0.92	4.10	4.40	25.58
1907.....	308,000	7.20	10.66	0.58	0.80	1.16	4.60	4.68	29.68
1908.....	262,000	7.70	9.72	0.68	0.76	2.20	5.12	4.90	30.98
1909.....	307,000	8.08	10.04	0.40	0.76	1.72	5.20	5.70	31.90

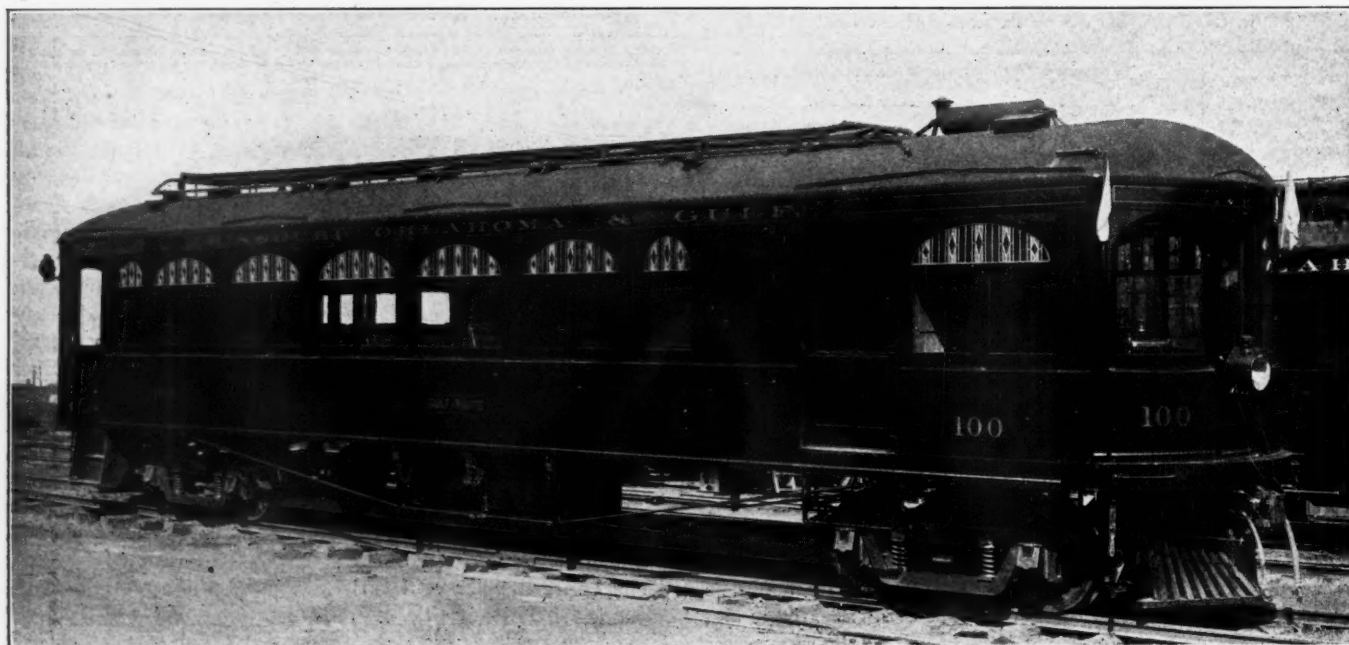
The Dracar may be handled from both ends. Although the engine is located at one end, both ends are equipped with the

necessary controlling apparatus for the engine itself as well as the motors, air brakes, etc. This feature has been found entirely practical in Europe, and on some roads the engine has been located in a separate compartment in the middle of the car. This makes possible its use on branch lines which have no turntables or wyes at their terminals.



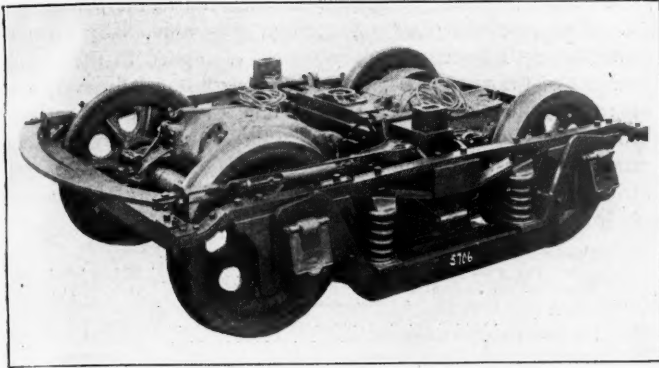
Interior of Missouri, Oklahoma & Gulf 56-ft. "Dracar."

At present there are two Dracars in service on the Missouri, Oklahoma & Gulf, and these are to run between Muskogee, Okla., and Henryetta, a distance of 50 miles. Four more have been ordered. The portion of Oklahoma through which this line runs is good farming land, but is sparsely settled, and this system of transportation has been adopted to provide a more frequent local service. While the cars in the present instance are not built for trailer service they will handle one light trailer.



Combination Gasoline-Electric "Dracar" for the Missouri, Oklahoma & Gulf.

They are divided into compartments for the engine-generator set, which extends across the car so as to occupy less space, baggage, colored and first class passengers. The carrying capacity is 14 colored and 30 first-class passengers. The seats are individual reversible chairs, upholstered in plush, and the spacing for both the seats and the aisle has been made liberal to provide for the passengers' comfort. Each passenger compartment is provided with a toilet room. The interior finish is in mahogany, dull finished. The partition separating the classes



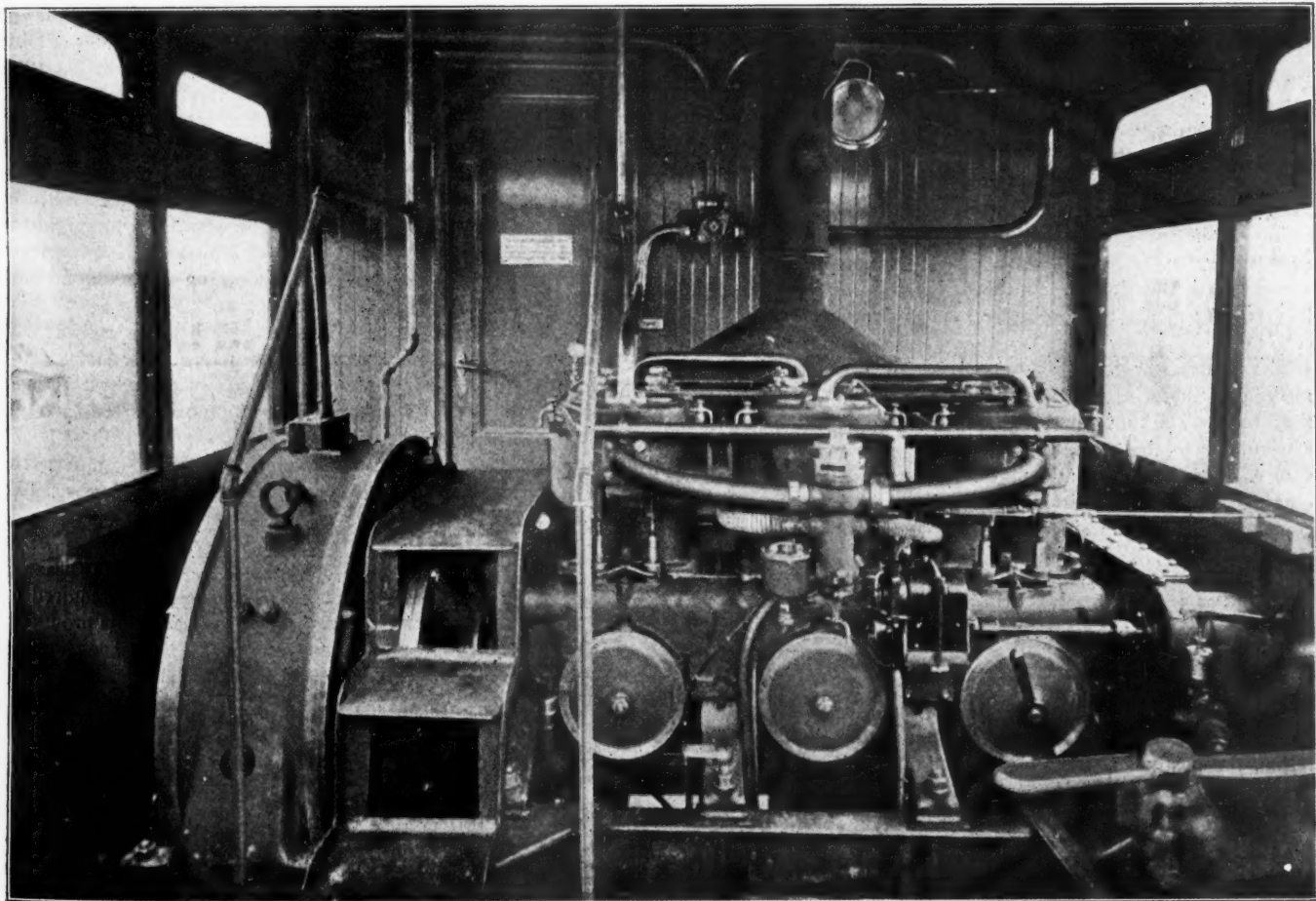
Driving Truck with Two 60 H. P. Motors.

to comply with the state law has a swing door and may be removed at will. Continuous package racks are also provided. The car is lighted by 30-volt metal filament lamps, fed from a storage battery, but the headlights are of the electric-arc type.

The engine is rated at 90 h. p. at 950 revolutions. There are 6 cylinders, about 5.5 in. x 6.3 in., which are cast in pairs. The engine is connected by flexible coupling to a 55 kilowatt, 500-600 volt, interpole generator. A special steel base combines both

units, by which means the group is attached to the floor and the underframe of the car. The engine room requires but 7 ft. 3 in. of the car's length, ample room being afforded for the controller, air brake valves, emergency hand brakes, etc. The cylinder water cooling system is placed on the roof of the car and circulation is secured by a geared pump. In winter the hot cylinder water is used for car heating. A Peter Smith heater is placed in the baggage room and is connected to both the car heating system and the engine radiator, so that the car may be kept warm and the water from freezing when the car is standing in yards or at stations and not under power. The gasoline supply is carried in two 30 gallon steel tanks and is fed by gravity to the engine. As the car consumes only one quart of gasoline per mile of straight level track, the storage capacity is ample for more than a day's run. The motors are the Westinghouse No. 305 interpole type, geared for a maximum car speed of 35 m. p. h. As the ruling grades on the Missouri, Oklahoma & Gulf do not exceed one-half per cent., it is expected that the average consumption of gasoline per revenue car mile will be one gallon for each four miles run. The St. Louis Car Company built the car bodies and trucks from designs of the Drake Railway Automotrice Company.

AUTOMOBILE SERVICE IN THE FEDERATED MALAY STATES.—The Federated Malay States Railways now operate, in addition to their regular train service, an automobile service for passengers, mail and parcels between Klang and Kuala Selangor, 28 miles, and between Kuala Kuba and Kuala Lipis, about 80 miles. While this service, considered alone, has never paid its way, the loss in 1911 having been \$30,605, it has undoubtedly had the effect of increasing the earnings of the system on the whole and has contributed much toward opening up sections remote from the railway. In 1910, 45 automobiles were in operation, including six motor trucks.



Power Group for Drake Gas-Electric Passenger Car.

MAIL CARRYING RAILWAYS UNDERPAID.*

Statement by Committee on Railway Mail Pay Shows
That Compensation Does Not Equal Operating Expenses.

The Committee on Railway Mail Pay, representing railways whose lines include 92 per cent. of the aggregate length of all railway mail routes in the United States, believes that the payments to the railways for the services and facilities furnished by them to the post office department are, and for a long time have been, unjustly low. This pamphlet contains a concise statement of the facts which prove that this belief is warranted and, incidentally, a refutation of the estimates made by the Postmaster-General, and reported to the Congress (House Document No. 105, Sixty-second Congress, first session), which led him to conclude that the basis of payment could now properly be changed so as to accomplish a present reduction of about 20 per cent. It will be shown that although the insufficient data and the erroneous methods employed by the postmaster-general resulted in his making estimates of cost to the railways that are far below the real cost, his own figures and calculations, when properly analyzed and supplemented, demonstrate that the mail service has not been fairly remunerative to the railways.

Congress has provided for a vast and incalculable extension of mail traffic by creating a "parcels post," to be inaugurated on January 1, 1913, which, by opening the mails to many articles not previously accepted at the post-offices and by materially reducing the rates on mailed merchandise, is expected enormously to increase the volume of the shipments which it covers. If the former practice of the Department is followed, no new contracts will be made until after the next quadrennial weighings in each of the four weighing sections, so that the position of the Government amounts to an assertion that the whole added volume of the parcels post mails will have to be carried without any compensation by the railways of New England for four years and six months (these railways are in the first weighing section, but the weighing for the adjustment to be made on July 1, 1913, has begun and will be completed before the parcels post is inaugurated), by those of the second weighing section for three years and six months, by those of the third weighing section for two years and six months, by those of the fourth weighing section for one year and six months, and by those of the first weighing section, not located in New England, for six months. No presentation of the injustice of the mail pay received in former years suggests even the approximate extent of the losses which the railways will thus incur in the next four and one-half years, unless readjustments are promptly made on account of the Parcels Post.

The postmaster-general assumed in his estimates heretofore mentioned that the railways would be properly compensated if they received a sum equal to the operating expenses and taxes attributable to the carriage of the mails plus 6 per cent. of the sum of those expenses and taxes. The calculation by which he obtained the sum which he assumed would have been proper compensation for the single month covered by his investigation was as follows:

His estimate of operating expenses and taxes on account of mail service (Document No. 105, p. 280) for one month.....	\$2,676,503.75
Six per cent. of above.....	160,590.22
Total, assumed to represent just compensation for one month	\$2,837,093.97

The railways having been paid, for the month selected, \$770,679.16 in excess of the sum resulting from the above calculation, the postmaster-general assumed that this excess over expenses and taxes plus six per cent. constituted excessive profit for that month. He multiplied this assumed excess by twelve to get his estimate of annual excess and stated the result, in round figures, as "about \$9,000,000."

*Abstracted from a statement by the Committee on Railway Mail Pay.

The mere statement of this method discloses the fact that it makes no allowance for any return upon the fair value of the railway property employed in the service of the public. Everyone recognizes that a railway is entitled to at least a reasonable return upon the value of its property devoted to the public service. The postmaster-general ignored this universally accepted principle and adopted a theory which, if applied to the general business of the companies, would render substantially every mile of railway in the United States immediately and hopelessly bankrupt. The recently published report of the Interstate Commerce Commission on the railway statistics of the year that ended with June 30, 1910, contains data by which this statement is easily demonstrated, as follows:

Operating expenses of all United States railways, for the year	\$1,822,630,433
Taxes of all United States railways, for the year	103,795,701
Total	\$1,926,426,134
Six per cent. of above total.....	115,585,568
Total gross receipts permitted by postmaster-general's plan	\$2,042,011,702

But if this plan had been in force, the railways would have had, for interest on mortgage bonds, a reasonable surplus as a margin of safety, dividends on stocks, unprofitable but necessary permanent improvements,* rents of leased properties, etc., etc., only the six per cent. or \$115,585,568. This figure may be compared with the following, among others:

Interest obligations (on funded debt only) of all United States railways, for the same year.....	\$370,092,222
Rentals of leased properties, all United States railways, for the same year.....	\$133,881,409

Plainly, the postmaster-general's proposal is equivalent to an assertion that the railways would make a fair profit if they were enabled to collect the sum of \$115,585,568 in addition to their operating expenses and taxes, but the figures given by the Interstate Commerce Commission show that this would be less than one-third of the sum necessary to meet interest charges which must be paid in order to prevent foreclosures of mortgages and, if bond interest could be ignored, is much less than the rentals that must be paid if the existing systems are not to be broken up. And, of course, it would allow nothing whatever for legitimate demands upon income for dividends, permanent improvements or surplus. Such a theory is not a theory of compensation—it is a theory of oppression and of destruction.

It cannot be too strongly emphasized that the railway mail pay at present is insufficient to pay even its proper share of operating cost and taxes and does not produce any return upon the property. Reports submitted to the postmaster-general by railways operating 2,411 mail routes, with a total length of 178,710 miles, showed that their gross receipts, per car-foot mile†, from services rendered on passenger trains during November, 1909, were as follows:

From mail	3.23 mills
From other services.....	4.35 mills

Thus it appears that the space on passenger trains required for the mails is proportionately less than three-quarters as productive as that devoted to passengers, express, milk, excess baggage, etc.,

*The necessity for providing, out of income, for some kinds of improvements is commonly admitted. The public constantly demands greater comfort and convenience which can be supplied only by improvements in property and equipment that bring in no additional income. A present example in the mail service, itself, is the great expense which the railways are now undergoing in substituting steel mail cars for those formerly in use. The old cars, which thus become a total loss, were fully up to the most advanced standards of construction when built and they could continue for a long time to serve the purposes of the service except for the public demand for stronger cars.

† A car-foot mile is a unit equal to moving one foot in car length (regardless of width or height) one mile. Thus to move a car sixty feet long one mile results in sixty car-foot miles; to move the same car three miles results in 180 car-foot miles, etc.

etc. As it is the general belief of railway managers, whose conclusion in this respect has rarely if ever been challenged, that the passenger train services, as a whole, do not produce revenues sufficient to meet their fair proportion of the operating costs and the necessary return upon investment, and therefore are not reasonably compensatory, it is evident that the mail service, the pay for which is more than 25 per cent. below the average for the other services rendered on the same trains, must bring in much less than reasonable compensation.

No merely statistical comparison can, however, reveal the whole story, for the railways are required to furnish many incidental facilities and to perform many additional services for the Post Office Department, which render the mail service exceptionally arduous and costly. These extra services include calling for and delivering mails at a large proportion of the post offices located at railway towns; supplying rooms, with light, heat and water, in railway stations for the use of the mail clerks; placing cars, duly lighted and heated, on station tracks for advance distribution, often many hours before the departure of trains; carrying officers and agents of the post office department as passengers but without compensation to the extent of more than 50,000,000 passenger miles annually (this being, of course, in addition to the railway mail clerks on duty), etc., etc. No one can examine this appendix and not be convinced that the mail service is the most exacting among all those rendered by American railways.

In accordance with the request of the postmaster-general, the railways estimated the cost of conducting the mail service and reported the results to the postmaster-general. After first charging to each service the expenses wholly due to it they apportioned the common expenses between the passenger and freight services, following (with inconsequential exceptions) the method most generally employed for that purpose, namely the apportionment of these expenses in the proportions of the revenue train mileage of each service. Having estimated, in this way, the operating expenses attributable to passenger trains, the railways assigned to the mails the portion of this aggregate indicated by the proportion of the total passenger train space required for the mails. Using this method, 186 railways, operating 2,370 mail routes, with a total length of 176,716 miles, ascertained and reported that for November, 1909, the operating expenses (not including taxes), for conducting the mail service were \$4,009,184. The postmaster-general states that all the railways represented in the foregoing, and enough others to increase the mileage represented to 194,978 miles, were paid for the same month only \$3,607,773.13. It thus appears that the pay was far below the operating expenses, without making any allowance for taxes or for a return upon the fair value of the property employed.

The postmaster-general, by his method of apportionment arrived at a cost of \$2,676,503.75, but this must be increased (as will be shown below, on account of his erroneous apportionment of car space) by \$800,802.00. And also on account of his refusal to assign expenses directly incurred in the mail service, \$401,126.* Total, according to the postmaster-general's method of apportioning costs between passenger and freight traffic, \$3,878,431.75. Thus even the postmaster-general's method of apportioning costs between freight and passenger traffic produces an operating cost in excess of the total pay received by the railways, leaving nothing whatever for return upon the fair value of the property or necessary but non-income producing improvements.

There is no allowance, in any of these estimates of cost, for the large volume of free transportation supplied to officers and agents of the Post Office Department, when not in charge of mail, although this amounts to over 50,000,000 passenger miles annually and, at the low average rate of two cents per mile, would cost the Post Office more than \$1,000,000 per year.

*There may be some duplication in this item, but to eliminate it would require an elaborate computation which, in view of the broad margin of expenses over receipts, is wholly superfluous. Whatever duplication exists must be small in comparison with this margin.

Moreover, all the figures here discussed are for the month of November, a month which, because of the abnormally low ratio of passenger traffic to freight traffic, substantially understates the cost of the passenger train service, when figures derived from it are applied to an entire year.

Reference will now be made to the methods and controlling effect of the postmaster-general's apportionment of passenger train space between the mails and the other services rendered on passenger trains. Having obtained certain estimates of the cost of the passenger train services, considered together, by methods producing the lowest results, the next step was to apportion a part of this cost to the mail service. The accepted method for such an apportionment is to distribute the total cost in proportion to the train space required by each of the respective services. The postmaster-general obtained from the railways statements which he might have used in applying this method, and these statements showed that 9.32 per cent. of the total space in passenger trains was required by the mails, but, instead of using the data showing this fact, he substituted figures of his own which reduced the space credited to the mail service to 7.16 per cent. of the total. The total of passenger train costs which the postmaster-general estimated should be apportioned among passengers, express and mail, on the basis of space occupied, was \$37,074,172.* He therefore assigned to the mail service 7.16 per cent. of the last-named sum or \$2,654,510.69. If, however, he had used the proportion of space, 9.32 per cent., resulting from the reports he had obtained from the railways, the amount apportioned as cost of the mail service for the month would have been \$800,802 greater. Multiplying this by twelve gives an increase in the estimated annual cost of over \$9,600,000.

Thus the postmaster-general understated the annual mail expenses and taxes of the railways by at least \$9,600,000, and he ignored entirely the necessary return on the value of railroad property.

This examination of his methods shows that the determination of space was of primary and controlling importance and that the changes in space allotment have destroyed the value of his deductions. These changes were due to his refusal to assign to the mail service the working space and temporarily unoccupied space on trains, which were necessary to the mail service and to his actually assigning much of this space to the passenger service rendered on the same trains. These modifications of the data correctly reported, not susceptible of justification upon any sound transportation principle, were carried so far that the tabulations of the post office department, which are stated for railway mail routes having a total length of 194,977.55 miles† show only 926,164,459 "car-foot miles" made in the mail service, although certain railways, included therein, and having railway mail routes aggregating only 178,709.96 miles, had correctly reported mail space equivalent to 1,153,110,245 "car-foot miles." Thus, although the department's figures cover 8.3 per cent. more mileage, its reductions of space resulted in assigning to this greater mileage about one-quarter (24.5 per cent.) less mail space. At the same time the department actually increased the space assigned to the other passenger train services, its figures showing 12,014,065,506 car-foot miles in these services for 194,977.55 miles of mail routes which must be compared with 11,222,478,739 car-foot miles reported by the railways for 178,709.96 mail-route miles.

As a part of the investigation reported in Document No. 105 the postmaster-general obtained from the railways statements showing the amounts expended by them for the station and terminal services required by his department and the amount of free transportation furnished on his requisition for officers and agents of the postal service when not in charge of mail. These

*This is the sum which was apportioned by the postmaster-general on the basis of train space occupied. He estimated \$40,121,294.83 (Document No. 105, page 280) as the total operating expenses and taxes of the passenger train services for the month. Of this total \$21,993.06 was charged directly to the mails and \$3,025,129.77 directly to the other passenger train services, leaving the sum stated in the text to be apportioned on the space basis.

† Document No. 105, p. 53.

data were not used and, as no adequate allowance was made in any other way for these expenses, the omission unjustly reduced the estimates of the cost to the railways of their postal services. The postmaster-general's explanation of this omission implies that it was partially offset by the assignment as cost of mail service of its proportion, on the space basis, of all the station and terminal expenses of the passenger train services; but these special mail expenses are disproportionately heavy and the amount so assigned was far too low. The expenses for station and terminal services especially incurred for the mails, during November, 1909, and reported to the postmaster-general, for 92 per cent. of the mileage covered by Document No. 105 aggregated \$401,136.00, as follows:

Amount of wages paid to messengers and porters employed exclusively in handling mails.....	\$79,980.84
Portion properly chargeable to mail service, prorated on basis of actual time employed, of wages paid to station employees a part of whose time is employed in handling mails.....	198,927.01
Amount expended for maintenance of horses and wagons and for ferriage, etc., in connection with mail service.....	5,640.98
Rental value, plus average monthly cost of light and heat, of room or rooms set apart for the exclusive use of the mail service.....	37,258.93
Rental value of tracks occupied daily for advance distribution of the mail.....	47,029.12
Average monthly cost of light and heat for postal cars placed daily for advance distribution of mail.....	18,400.57
Interest at the legal rate upon the value of cranes, catchers and trucks required for mail service....	3,895.36
Total	\$401,126.00*

*This total includes \$9,993.19 reported by four companies which gave totals for these items, but did not report the items separately.

All the foregoing data were reported to the postmaster-general in response to his request, but he made no use of these items, an omission manifestly to the serious disadvantage of the railways and having the effect of unduly reducing his estimates of the cost of the mail service.

Similarly, the postmaster-general omitted to use the data he had obtained from the railways showing the volume of free passenger transportation, already referred to, supplied to the officers and agents of the post office department, and his estimates contain no recognition of the cost of this service, although its extent should be a matter of record in the department, as it is furnished only on its requisition. The space in passenger coaches occupied by these representatives of the post office department, traveling free, was not assigned to the mail service, but was treated as passenger space.

A commission of Senators and members of Congress which, between 1898 and 1901, most fully and carefully investigated the subject, ascertained and declared that railway mail pay was not then excessive; since then there have been many and extensive reductions in pay accompanied by substantial increases in the cost and value of the services rendered by the railways.

These reductions have so much more than offset the rather doubtful advantages which the railways might be assumed to have obtained from the increased volume of mail traffic that in 1912 they find their mail service more unprofitable than ever before. The following table shows the facts:

Fiscal Year.	Total railway mail pay.	Average railway mail pay per \$100.00 of postal receipts.
1901.....	\$38,158,969	\$34.18
1904.....	43,971,848	30.62
1907.....	49,758,071	27.10
1910.....	49,405,311	22.04
1911.....	50,583,123	21.26

The foregoing shows that the post office department expended for railway transportation, in 1901, \$34.18 in order to earn \$100 in gross, and that by 1911 this expenditure had been reduced 37.8 per cent. to \$21.26.

No one will contend for a moment that there has been any net reduction in the cost of supplying railway mail services and facilities since 1901, the year in which the report of the Joint Commission to Investigate the Postal Service was made. In fact, all changes in railway operating costs, except those due to increased efficiency of organization and management, which can have little

if any effect in connection with mail traffic, have been in the opposite direction. During the years characterized by these reductions the railways have been called upon continually to improve the character of their postal service, and the post office department will not deny that the railways are now rendering better, more frequent, and more expeditious postal service than in 1901, or any intermediate year, and are doing so at greatly increased cost to themselves.

That the recent savings of the postal service have been wholly at the expense of the railways is shown by the following:

	1901.	1911.
Postal gross receipts.....	\$111,631,193	\$237,879,823
Postal expenses, all purposes—		
Total	\$115,554,921	\$238,507,669
Per cent. of gross receipts.....	103.5	100.3
Railway mail pay—		
Total	\$38,158,969	\$50,583,123
Per cent. of gross receipts.....	34.2	21.3
Postal expenses other than railway mail pay—		
Total	\$77,395,952	\$187,924,546
Per cent. of gross receipts.....	69.3	79.0

This table shows that in the ten years from 1901 to 1911 the post office department reduced its operating ratio between its total expenses and its gross receipts from 103.5 per cent. to 100.3 per cent., being a reduction of 3.2 points; but it also shows that this improvement was due solely to the fact that the ratio of railway mail pay expenses to gross receipts was reduced from 34.2 per cent. to 21.3 per cent., a reduction of 12.9 points, while the ratio of all other expenses to gross receipts increased from 69.3 per cent. to 79 per cent., an increase of 9.7 points. Thus the improvement of 3.2 points in the ratio for all expenses was due entirely to the greatly reduced ratio of railway mail pay, the heavy reduction in that respect exceeding by 3.2 points the very substantial increase in the ratio of all other expenses.

That increases in postal expenditures were necessary, between 1901 and 1911, is not denied. The period was one in which steady and extensive increases in the cost of living made necessary considerable increases in the salaries of postal employees and in the cost of postal supplies, precisely as the railways were impelled to increase the salaries and wages of their employees and were obliged to pay higher prices for their supplies. In other words, the purchasing power of the American dollar, and of standard money everywhere, greatly decreased and this decrease affected the post office department as it has affected every business undertaking. But the purchasing power of the railway dollar decreased exactly as that of all other dollars, and it was unreasonable and unjust that while this charge was in progress, the losses which it entailed in the postal service of the government should be shifted, as it has been shown that they were, to the railways which were, at the same time, suffering far greater losses from the same cause.

The transportation pay received for each railway route is determined, under the practice of the department, for a period of four years on the basis of the average daily weight carried during a period of about three months duration prior to the beginning of the period for which it is fixed. Thus, by the terms of the law, the government upholds the principle that weight should be the basis of payment but, by an inconsistent practice, denies that principle and creates a condition under which it is practically certain that the weight actually carried will differ materially from the weight paid for. Congress, surely, never intended this result, for the provision of law is, merely, that the mail shall be weighed "not less frequently" than once in four years, and clearly implies an intention that it should be weighed whenever a substantial change in volume has taken place. But the post office department controls, subject to the provision of law, the frequency of the weighings, and naturally seeks those reductions in its expenses which can be effected without loss anywhere except in railway revenues. Consequently, it long ago ceased to order new weighings, except when compelled to do so by the expiration of the statutory limit. It thus happens that while the railways are paid on the basis of a certain average daily

weight they are frequently carrying a much greater weight and with no compensation whatever for the increase in the weight. In other instances the change is in the opposite direction, but with increasing national population and wealth it is obvious that most of these changes must be to the injury of the railways. However, the element of uncertainty thus introduced into each contract is unbusinesslike, and in fairness to both parties ought to be removed. No railway would make a four years' contract to carry, for a definite sum, the unlimited output of any manufacturing plant, and if it attempted to do so the contract would be void under the Interstate Commerce law.

Railways are required to transfer the mails between their stations and all post offices not more than a quarter of a mile distant from the former and, at the election of the post office department, to make similar transfers at terminals. For the former no compensation is accorded, and for the latter the allowances are inadequate. There are numerous instances in which these extra services require expenditures, on the part of the railways concerned, that exceed the total compensation of the mail routes on which they occur. The extent of these requirements in particular cases is largely subject to the will of the department, and this produces unreasonable uncertainties as to what may be demanded during the life of any contract. The basis of payment plainly does not contemplate such services; they are a survival from the period when the mails were carried by stage-coaches, which could readily deviate these distances from their ordinary routes, and it is clear that the government ought to perform these services itself or reasonably compensate the railways therefor.

Much of the mail moved by the railways is carried in cars especially equipped as traveling post offices in order that it may be accompanied by postal clerks who perform, on the journey, precisely the labor which they would otherwise perform in local post offices. Cars so used can be but lightly loaded and are costly to supply, to equip, to maintain and to move. Their use has greatly increased the efficiency of the postal service and vastly expedited the handling of the mails. In the infancy of this service Congress provided for additional payments for the full cars so required, but when the practice of requiring portions of cars for the same identical purpose was inaugurated no provision for paying for them was made, and this condition never has been corrected. Even in Document No. 105, the injustice of this situation is recognized, and the postmaster-general asserts that it is a purely arbitrary discrimination and without logical basis. Obviously a reasonable allowance for apartment cars ought to be made.

The foregoing discussion makes plain the error and injustice in the postmaster-general's proposal to pay the railways for carrying the mail upon the basis of returning to them the operating expenses and taxes, as ascertained by the post office department, attributable to the carriage of the mails, plus six per cent of the sum of these expenses and taxes.

The ascertainment of the cost to a railroad of conducting mail service is necessarily very largely a matter of judgment and opinion, because a large proportion of the total operating expenses are common to the freight and passenger traffic and can only be approximately apportioned. There is room for a very wide discretion in the making of such apportionments. It would not be right or proper to entrust the post office department with the discretion of making such apportionment, because the post office department has an obvious interest at stake, its object always being to reduce the railroad pay to a minimum.

The last preceding statement is fully justified by the facts disclosed, which show how consistently the post office department has relied upon reductions in railway mail pay as the ever available source of desired curtailments of expenses and how unsuccessfully the railways have resisted this persistent pressure. They show that successive postmasters-general have taken advantage of every legal possibility, such as taking the longest time between mail weighings which the law permits, and the

strained interpretation of the statute fixing the basis of payment, in order to effect reductions in railway mail pay. Consequently, the facts point irresistibly to one conclusion, namely, that the post office department is a bureaucratic entity with an interest in the reduction of the amounts paid to the railways that is incompatible with an impartial ascertainment of what is fair compensation. This interest, coupled with the brief tenure of the responsible officers of the department, must always incline the latter to support insufficient standards of mail pay and prevent their recognizing the ultimate necessity of paying fairly for efficient service. It would, therefore, be clearly inexpedient and strikingly unjust to place railway mail revenues wholly at the mercy of the department by enacting a law which would authorize each postmaster-general to fix railway mail pay on the basis of his own inquiries and opinions in a field in which so much must be left to estimate and approximation as that of the relative or actual cost of the different kinds of railway service.

It is conceded that every railway mail contract is between the government, which is the sovereign, and a citizen, and that the nature and terms of the contract are always substantially to be dictated by the former. But this very condition invokes the principle of primary justice, that the sovereign shall take care to exercise its power without oppression. To this end the determination of the terms on which the post office department may have the essential services of the railways ought to be reserved, as at least partially in the past, to the Congress; or, if delegated at all, it should be entrusted to some bureau or agency of government not directly and immediately interested in reducing railway mail pay below a just and reasonable compensation.

GOVERNMENT REPORT ON ANTIOCH DERAILMENT.

The Interstate Commerce Commission has issued a report, dated September 21, giving the conclusions of Chief Inspector Belnap on the cause of the derailment of a passenger train on the Cincinnati, Hamilton & Dayton, at Antioch, Ill., August 25, when one passenger was killed and 25 were injured. Mr. Belnap does not accept the theory that the derailment was caused by a broken flange.

The train, consisting of five cars, was running at about 30 to 35 miles an hour. The track is straight and is laid with 60-lb. rails, 30 ft. long; 16 ties under each rail; coarse gravel ballast. The first wheels to leave the track were those of one of the trucks of the tender. The track was in very bad condition. Many of the ties were decayed, and one competent witness said that only about one in ten of them was fit for service. In the majority of the ties the spikes had become loose; many had worked from $\frac{1}{2}$ in. to 2 in. Many bolts were missing at the joints. Photographic illustrations are given in the report showing the bad condition of the ties and the absence of spikes. The roadbed is covered with weeds. The foreman in charge of the track had held that position three months, and during this time the spikes had not been tightened. He said that he had an insufficient force of men. His section is six miles long; he needed six men; had been instructed to hire three; but had been able to get only two. The flanges of the forward wheels of the rear truck of the tender were somewhat broken, but the inspector concludes that the breaks were the result of the derailment and not the cause of it. The marks made by the wheels on the surface of the rail were such as could have been made only by a whole flange. The edges of the breaks in the flanges were clear and sharp.

In many places the track was found to be in such condition that the rails were depressed from 1 in. to 2 in. under the weight of a passing train, though when there was no weight on the track it appeared to be in good condition. Track, which by the gage appeared to be in correct alinement, was found to

be so loose, owing to the worn condition of the spikes and to the spikes having been pushed over, that the rails could readily be pushed $1\frac{1}{2}$ in. out of gage by a passing train. Many shims were found to have become loosened and to have jarred out. Many spikes could be pulled out by hand. At three rail joints the splice bars were found broken and the breaks were old. In a length of 92 rails 578 bad ties were found; in another place a length of 55 rails showed 328 bad ties. In still another case there were 94 bad ties in 270 ft., or an average of 10 to a rail. The engine of the train was larger and heavier than had ever been used on this division before, but the report does not give its weight.

The conclusion of the inspector is in accordance with the foregoing statement, his opinion being that the bad track caused the tender to rock to such an extent that the forward truck mounted the rail.

THE FINANCIAL CONDITION OF THE PRUSSIAN STATE RAILWAYS.

The Prussian minister of finance has recently made a report, to the commission in charge of the budget, regarding the condition of the state railways. While pleased at the present condition of affairs, he does not think that he is justified in being too optimistic for the future.

He states that in 1908 the net income of the railways amounted to \$24,800,000. In 1910 it was \$70,200,000, or \$32,400,000 above the appropriation, by which \$17,800,000 could be turned over to the "compensation" account. As for 1911-12 he anticipates that the result will be still more favorable in spite of the injurious effects of the strike in the Ruhr district. In fact the railway management thinks, at present, that it will be able to turn over from \$35,000,000 to \$37,000,000 to the "compensation" account.

These favorable results are regarded as dependent upon the industrial activity of the country, which is reflected by the increase of railway receipts. It has been possible to cut down the corresponding increase of expenses during the period covered by the last reports so that the operating ratio was 67.27 per cent. for 1910. This ratio was about 66 per cent. for 1911. But future requirements of railways are difficult to foresee. They naturally depend, in the first place, on the development of the receipts, and it is stated that during the fiscal year of 1910-11 they increased, but under very favorable conditions of the traffic. In 1895 the freight train load was 212 tons; in 1900 it was 198 tons; in 1905 it was 201 tons; in 1908 it was 210 tons; in 1909 it was 232 tons, and in 1910 it was 236 tons. The loading is, therefore, improving. It is true that this has only been made possible by an improvement in the equipment, especially in the power of the locomotives.

During last February the receipts amounted to \$4,980,000, or 12.74 per cent. more than for the same month in 1911. The point in doubt is the possibility of maintaining the balance between the amount of traffic and the facilities for handling it, and consequently between receipts and expenses. It seems probable that the summit has been reached. The management considers that the amounts contributed to the compensation account in 1910 and 1911 as exceptional, and does not think that the operating ratio can be maintained at the level then established. A consideration of the past shows that during the preceding four years the increases of wages and salaries have raised the operating ratio by about 4 per cent. But outside the increase of salaries and the cost of materials, there is a whole series of unfavorable conditions that must always be counted upon to affect this ratio, especially those which tend to offset the increases in passenger and freight receipts, namely, the great development of branch lines, the increasing demands of the passenger traffic

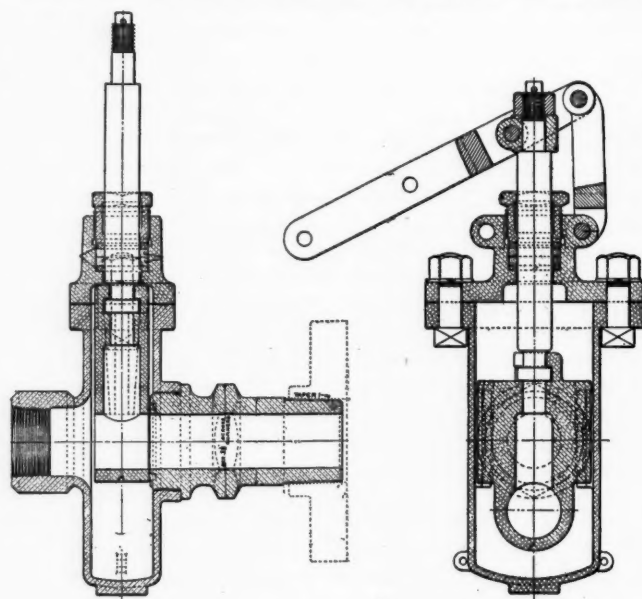
in the matters of comfort and speed, and the increased cost of safety of operation.

The minister adds that when the future financial situation of the railways is considered, account must be taken of the increasing burden imposed by extraordinary appropriations, and the effect of the general necessities of the state. In consequence of the increase of capital invested by about \$100,000,000 per year, this charge is subjected to an annual increase of \$3,250,000. To this must be added an increase in interest charges of \$2,500,000 per annum, which totals \$5,750,000. On the other hand, it must also be remembered, that for the same conditions, the operating ratio, when taken for a long period, has a tendency to rise, as, for example, between 1895 and 1910 it rose on an average of .75 per cent. per year. Now this fact alone represents a supplementary annual charge of \$4,250,000, which, added to the \$5,750,000 already provided for gives a total of \$10,000,000. In order to obtain this net amount above the net income, it is necessary, using the operating ratio of 1910, to add about \$30,000,000 to the receipts. In the face of such an outlook the new regulation affecting the use of extraordinary appropriations of the state funds must be borne in mind. This regulation is only susceptible of a very limited temporary application, for it implies very important increases in charges, the amount of which cannot be foreseen.

LOCOMOTIVE BLOW-OFF VALVE.

The L. J. Bordo Company, Philadelphia, Pa., after a careful study of conditions, has come to the conclusion that the exacting service required of locomotive blow-off valves demands a special material for their construction. It is therefore placing on the market a new type of valve, known as the reversible gate blow-off valve, which is made of a hard bronze consisting of pure tin and copper.

The other advantages claimed for the valve, which is shown



Bordo Reversible Gate Locomotive Blow-Off Valve.

in the accompanying drawing, are that it has no pockets in which water may lodge and freeze; there is nothing to obstruct the passage of scale or hard substances, thus preventing possible engine failures from this source; the reversible gate should give double the service of one which can be used on one side only; the renewable seat is out of the range of pressure; and a lever arrangement is provided by which the valve may easily and conveniently be adjusted.

Maintenance of Way Section.

THE installation of a labor bureau on the Baltimore & Ohio as a branch of the maintenance of way department to recruit laborers for the various kinds of maintenance work, marks an advance in the methods of securing unskilled labor for railway service which will be watched with much interest. While railways have given exclusive contracts for supplying all labor to one agent, in this way making him the official labor agent of the road, this is the first time, so far as is known, that a railway has created a labor bureau under its sole direction and has attempted to secure the laborers needed for its work through agencies under its direct control. With branches in all the labor centers on this system, such an organization should be able to secure men better than in the old way, and the results for the few months in which this bureau has been organized justify this conclusion. As it becomes known among the laborers that the road is conducting its own labor bureau and that a man can secure work without paying the customary fees, it will probably be found that a large proportion of those employed will return from year to year. Such a bureau should also be valuable in securing laborers for other departments; in fact, the Baltimore & Ohio's bureau already has been called on to supply laborers for several departments besides the maintenance of way.

THE universal prevalence of broken rails last winter is still fresh in the minds of all, and should impress upon every maintenance officer the necessity of getting his track into the best possible condition before the roadbed freezes. Aside from the inherently defective rails, which have been discussed at length in these columns, many sound rails have been broken by flat wheels and because of defective track conditions. For these the railways must assume the full burden; and the responsibility for track conditions rests directly upon the roadmaster and his forces. In some cases rails may be supported on unsound ties. More frequently the track is not properly surfaced and drained. In most parts of the country it is still not too late to go over the track carefully and see that everything possible is done to bring it into such condition that the unnecessary stresses upon the rail will be reduced to a minimum. A little additional care expended now in going over the track carefully, raising all low spots and seeing that the rail has a full bearing upon all ties and that they in turn are firmly supported by the ballast, will save much trouble and work later on when the extreme cold weather comes. After the roadbed freezes, the best that can be done until spring is to insert shims promptly and carefully as the track heaves in order to give the rail the best bearing that is possible when the other conditions are the most unfavorable.

CONTRARY to the expectations of many the railway labor situation has not been materially relieved with the approach of winter. Usually at this season men are plentiful and gangs are being laid off, but this year, especially in the Eastern states, it is as hard to get men now as at any time during the summer and in some places work is almost at a standstill because of lack of sufficient forces. The condition of the track in many cases reflects this situation. Not only has more work been deferred until late in the season than is usual, but the track itself is in poorer condition in many places than is customary at this time. One thing particularly noticeable is the early reduction of the section forces to a winter basis by the action of the men themselves. In the Central Western states many who know that their employment on the track will last only a short time have gone into the corn fields, where the wages are higher, while in the

Eastern states a similar exodus to the factories has occurred. In the face of the outlook for a large amount of railway development next year, this labor situation presents a most serious problem. The present indications are that much new construction and improvement work will be undertaken during 1913, and in many quarters it is felt that the amount opened up will be limited only by the labor which can be secured.

IT is interesting to note the favor with which the Japanese are looked upon as track laborers by those who have employed them. The most frequent complaint heard is that their numbers among the railway forces are continually decreasing since no more are coming to this country to replace those who are leaving the railway to engage in other industries, such as fruit farming and truck gardening. Their fields of labor have been confined almost entirely to that portion of the country west of the Rocky mountains. The Japanese compare advantageously with other foreign laborers in their desire to learn the English language and their rapid mastery of it, their general willingness to work and the interest displayed in the work and in their cleanliness in personal habits. Their desire to learn the English language is indicated by the fact that the Educational Bureau of the Union Pacific was called on to translate the track course into Japanese for the benefit of the 600 men of that nationality in the track department; and the proportion of Japanese taking the course to the total number of Japanese employed was much greater than the ratio of native workmen. While there has been a strong feeling against the Japanese in the western states because of the fear of their competition with the native American laborers, this competition would not occur in track work since comparatively few native Americans are to be found here today. On the other hand, the Japanese would compete with foreigners of other nationalities, and the competition would resolve itself into a case of the survival of the fittest.

THE contest on methods of promoting safety in the maintenance of way department, which closed October 25, indicates very clearly that the universal interest in the subject of "Safety First" is not confined to the shop men and switch men, although the principal attention has been paid to eliminating injuries among these classes of employees. (As an indication of interest taken by the men on the track, it is currently reported that on a southern road the negro section laborers are now carrying "safety" razors for "social purposes!") There were 27 papers entered in the contest, and while many of them are from roadmasters and higher officials, a large number of section foremen are also represented in the list, showing that the safety propaganda has interested a very large number of these men, upon whom rests almost entirely the responsibility for securing safety among the foreign laborers who so largely predominate in section and extra gangs. The judges of the contest, T. J. Foley, assistant general manager of the Illinois Central; E. H. Lee, chief engineer, Chicago & Western Indiana, and H. G. Clark, assistant to second vice-president, Chicago, Rock Island & Pacific, awarded the first prize to G. W. Andrews, inspector of maintenance, Baltimore & Ohio, Baltimore, Md., and the second prize to L. J. Evans, foreman, Western Pacific, Stockton, Cal. Other papers which have been accepted and will be published in this and succeeding issues were submitted by E. H. Barnhart, assistant division engineer, B. & O., New Castle, Pa.; B. A. West, roadmaster, A. T. & S. F., Pueblo, Colo.; E. M. Grime, supervisor bridges and buildings, N. P., Glendive, Mont.; M. Ganley, roadmaster, A. T. & S. F., Argentine, Kans.;

W. E. Davin, supervisor, P. & L. E., McKees Rocks, Pa.; F. E. Crabbs, roadmaster, C. & N. W., Chicago; C. Thompson, section foreman, C. & N. W., Correctionville, Ia.; Earl Barton, section foreman, C. & N. W., Huron, S. D.; F. M. Patterson, assistant engineer, C. B. & Q., Chicago; Richard Brooke, assistant division engineer, B. & O., Pittsburgh, Pa.; O. B. Cook, section foreman, C. & N. W., Parkersburg, Ia.; D. O'Hern, roadmaster, E. J. & E., Joliet, Ill.; G. B. Jennings, Frisco, Ft. Scott, Kans.; G. R. Talcott, assistant division engineer, B. & O., Baltimore, Md.; John A. Johnson, section foreman, C. & N. W., Peninsula division; Emil Knack, section foreman, C. & N. W., Oshkosh, Wis.; Chas. Wood, foreman, C. & N. W., Marshalltown, Ia.; R. O. Gillies, roadmaster's clerk, St. L. & S. F., Ft. Scott, Kans.; O. C. Spieth, B. & O., Cleveland, O.; F. Dohr, section foreman, C. & N. W., Galena division, Chicago; E. B. Fithian, general roadmaster, M. P., Little Rock, Ark.; A. Bailey, section foreman, C. & N. W., Chadron, Nebr.; E. R. Coggin, chief clerk to roadmaster, Southern Railway, Knoxville, Tenn., and R. Holland, division roadmaster, St. L. & S. F., at Neodesha, Kans.

THE statement was made at the recent convention of the Bridge & Building Association that over 90 per cent. of the railways buy their turntables from the manufacturers on a competitive basis without specifications and accept the manufacturer's designs. The same statement can very probably be made about the purchase of track scales. This condition works to the disadvantage of both the railways and the manufacturers in a number of ways. In the first place, the design is in the railway company's hands only to a very limited extent and it is difficult to secure alterations, which the experience of the user and local conditions may render advisable, without extended negotiations with the different manufacturers, or limiting purchases to one company. Again, when buying in the open market without specifications, unfortunately, the item of price very frequently has a greater influence than it should have, especially when the purchases are made through a department not entirely familiar with the material in question, and quality may be sacrificed for price. Many manufacturers claim this is true to a very large degree in the railway field. The result is to force some manufacturers against their will to cheapen their products to enable them to meet the bids of their competitors, or to lose a large proportion of the business. This is to a large degree just what has happened in the design of turntable centers and accounts for the frequent criticism that they are too light for the heavy power used today. It is interesting in this connection to note that one of the first things done on the few roads which have made their own designs for turntables has been to materially strengthen these parts. While much of the progress in the design of all lines of equipment is due to the energy shown by the manufacturers, even greater development can be expected when the representatives of the railway companies who are close to the actual service conditions and who can observe the defects and weaknesses in use, exert an influence on the design to meet these service conditions. This must be done with due regard to the increased cost, which will surely follow unnecessary multiplication in number of standards. However, a railway can well afford to carefully study the types of materials in use with the idea of preparing standard designs and specifications and then inviting bids from the various manufacturers upon this basis. In this way apparatus can be secured which will be designed directly for the purpose for which it is to be used and all manufacturers can bid on a common basis. This is especially important at the present time with regard to scales in view of the investigations now being conducted, and it would appear advisable for the railways to maintain under their direct control, the design of the scales. Unnecessary duplication in standards could be prevented by the prominent railway engineering association preparing designs based upon the varied experiences of

the roads, which designs should be available for the use of all. The specifications for track scales by H. T. Porter, given elsewhere in this issue, are important as marking a distinct forward step in this direction.

THERE are few places where careful organization and system are more essential to economy than in the storing and handling of material, and in spite of this there are few details in the maintenance department to which attention could be paid with better results on most roads. The first cost of proper equipment and facilities frequently prevents their installation, even though this cost may be small and may be recovered in a few months. Also, in the continual press of urgent work, that which can be put off is deferred and frequently never done. A third reason is a lack of a realization of the advantages derived from a systematic handling of material and of a knowledge of the best methods to pursue. Economy is, of course, the most important advantage gained. One man stated at the recent convention of the Bridge and Building Association that by means of a self propelled crane he had reduced the cost of handling lumber to \$.35 per 1,000 board ft. as compared with a cost of \$2 to \$5 for handling by hand. It is frequently of great importance to have the material so arranged that it can be loaded quickly in case of a wreck, washout or other emergency. On some roads careful attention has been given to this subject by the general officers, while on others, the problem has been worked out locally on certain divisions. We desire to bring out as many of the methods used as possible and announce a contest on the storing and handling of material. Descriptions of any method of handling material in any branch of the maintenance of way field will be eligible. The description should go into detail regarding the method used, the amount of material to be handled, the conditions under which it is handled and the advantages gained. Where possible, a comparison of the cost of handling with other methods should be made. Photographs or sketches will assist materially in making the description clear in most cases. Descriptions of the methods of handling material in small yards where the use of mechanical equipment is not justified or it is not available, are of as much importance as those of larger yards more favorably situated. Frequently the absence of proper facilities gives rise to very practical ideas. We will pay \$25 and \$15 for the two best papers received and will pay our space rates for all other contributions accepted and published. All contributions must be received by the Civil Engineering Editor, *Railway Age Gazette*, Transportation building, Chicago, by December 25, in order to be considered by the judges of the contest.

TIE SPACING WHEN RELAYING RAIL.

WHILE the suggestion made by Mr. Keough in another column in this issue that it is not necessary or advisable to space ties, and especially joint ties, when laying rail, will be considered very radical by many, it is in reality not as radical and untried as might at first be supposed. At least one road, the Pittsburgh & Lake Erie, has already studied this question carefully and has entirely omitted the spacing of ties when laying rail, for the past two years. The development of this practice on this road is interesting.

For a number of years the engineers had listened to the extended controversies regarding the relative merits of suspended and supported joints, and in many instances the sentiment seemed evenly divided. When the Beaver bridge was built across the Ohio river a special unslotted angle bar was designed and used in the track across this structure. Shortly after this, during the installation of a number of complicated crossovers and turnouts, it was found impossible to space the ties at the joints to conform to the standard practice and the supervisors were finally instructed to maintain a uniform tie spacing and allow the joint

to come where it would at these places. The same unslotted angle bar was used at these joints and the track held from creeping by anchors applied at other places on the rail. It was soon noted that these joints were standing up at least as well as others supported by the standard tie spacing, and in view of this and of the disagreement regarding the best spacing of ties at the joints, the question was naturally raised whether the spacing of the ties at the joints was really of primary importance on a road where good line and surface are maintained. It was decided to disregard the spacing of joint ties about three years ago, and a portion of the rail laid that season was placed without disturbing the ties, the same unslotted angle bar being used at the joints and the anchorage being secured by applying anchors at the quarter points. No bad results being noted from this, it was adopted as standard practice, and this practice has been followed with all the rail that has been laid during the past two seasons.

The officers in charge of this work believe that they have secured several advantages from the adoption of this method. The first and most important is an immediate saving in labor of about \$125 per mile, which is made by omitting the spacing of the ties and surfacing the track when the rail is laid. As a direct result of not disturbing the track, a further saving is made in eliminating the necessity of later surfacing by the section forces. Also by eliminating the surfacing it is possible to proceed with the relaying of the rail with perceptibly smaller forces than would otherwise be possible.

Upon many roads where ties are spaced as the rail is laid, instructions are enforced requiring the surfacing gang to keep within a specified distance of the rail gang, frequently as close as one mile, and the steel gang may be held up if it gets more than this distance ahead of the surfacing gang. When the ties are not disturbed it is practicable to lay rail during the late fall and winter, which would not be possible if the roadbed were to be disturbed. In one instance on the Pittsburgh & Lake Erie last year, it was found late in the season that rail would be available for relaying a certain portion of the track, and while it would not then have been advisable to have proceeded with this work by the usual method, the rail was relaid without disturbing the ties and the use of the new rail was secured during the winter. This suggests the possibility of laying a large amount of the rail during the winter months, and in this way not only securing better labor than is available in the summer, but also, if combined section forces should be used, providing a means for employing these men during the winter in order to hold them throughout the rest of the year.

The most important disadvantage urged against this method is the danger of the new rail being damaged after being laid, and this is serious enough to warrant very careful consideration. For this reason, tie spacing should not be eliminated on poorly maintained lines where the line and surface are not good at all times, and where the rail is not well anchored. An inspection made a few days ago of rail laid in this way which had been in the track on the Pittsburg & Lake Erie three years failed to show that the rail was damaged in any way. As Mr. Keough suggests, if surfacing is advisable, a much smaller raise is possible where the ties are not spaced than where the entire roadbed is disturbed. A second objection may arise because of the practice of some roads of making heavy tie renewals at the time the rail is relaid. It is true that ties can be renewed cheaper then, but frequently this very fact tends to induce foremen to allow the condition of the ties to deteriorate when they know that rail will be renewed at an early date.

While many will undoubtedly criticize the method suggested by Mr. Keough, the fact that a road with as high maintenance standards as those of the Pittsburgh & Lake Erie has adopted it and that rail laid in this way three years ago shows no bad effects under the very heavy traffic of that railroad, will commend this method to the serious consideration of the maintenance officers.

Letters to the Editor.

ELIMINATING TIE SPACING WHEN RELAYING RAILS.

AURORA, Ill., November 5, 1912.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have been studying the subject of rail anchorage to some extent recently and am convinced that the anchoring of angle bars or joints, which is now generally the custom, has outlived its usefulness. There was a time when the rail sections were light when it was necessary to allow a large opening at the joint to provide for expansion, as these light rails with little or no ballast buckled readily with the heat. Inadequate joint fastenings made it necessary to see that a substantial joint tie was placed under the joint. In order to insure constant support the joint tie was anchored by slotting the rail ends and chairs and later the angle bars. While the first anchoring was done primarily to keep the tie in proper position, it now serves a different purpose. Nearly all tracks carrying traffic in only one direction and those on heavy grades require anchoring of the rails, and the joints being handiest to anchor are used for this purpose.

It is an easy matter to see that no beneficial results are obtained in having the ties under a joint constantly disturbed and moved out of position, as is the case when the joint is anchored. On single track where the traffic is in both directions, these ties are in even worse condition than where the traffic is all one way, as changes of temperature draw the anchored joint tie, or ties, backward and forward, causing the ballast to "pump out."

Since there are now some anchors which do good work, I am convinced that we should disregard joints as anchoring places and should anchor the rail at other points. This idea was first impressed upon me by noticing the old long angle bars. The middle tie was not slotted and it was always found that this was the only solid tie of the three, as the other ties were being constantly disturbed in the ballast. I have also found around yard tracks under heavy traffic better joints where the joint ties are not spaced, as is sometimes the case with joints near switches.

By doing away with the anchoring of the joints we can eliminate the spacing of ties in relaying rail, as a result of which I believe that large savings can be made. Under our present system we spend about \$260 per mile for labor in laying rail. We then spend from \$200 to \$225 additional to space our joint ties properly and to surface the track, this usually requiring that we move every tie in the rail to a new bed. After the track settles it is necessary to send good sized section gangs back over this work to resurface the track and put it back into good shape. I find that this resurfacing requires as much time as if the same gang leveled up the track behind the new rail. Many men will say that "leveling up will not do" and the track will get rougher than before. I do not believe this is the case, but that this idea results from the old system of digging joint ties around into place, which certainly does make the track worse, especially with the present labor we have to use.

We now spend nearly as much money dressing up our track as we do to lay the rail. By not spacing the ties we can make a saving in labor of over two-thirds of this present cost of surfacing, to say nothing of the great saving in ballast which is an item of much importance in itself. Some will say that we must surface track every so often to insure proper bearing. This is no doubt true, but a raise of one-half inch in gravel and slightly more in stone will give as uniform a bearing as a raise of three or four inches. This half inch raise, however, is not practical and will do but little good when it is necessary to space the ties and larger raises are generally made. Even if general surfacing and new ballast is required in some places, I believe we have many places where this is not necessary and think that if this matter is given proper consideration it can be adopted in many instances with a large saving.

E. KEOUGH,

Roadmaster, Chicago, Burlington & Quincy.

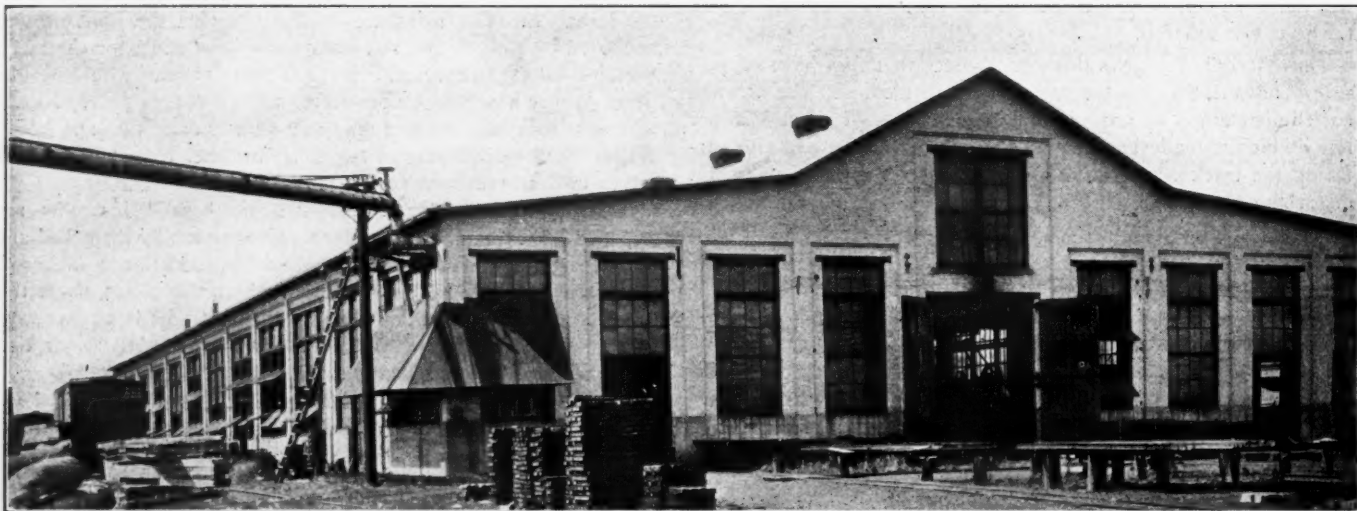
FROG AND SWITCH SHOPS OF THE C. M. & ST. P.

Description of Arrangement and Operation of a Large Railway Plant for the Manufacture and Repair of Track Material.

The shops of the Chicago, Milwaukee & St. Paul which are devoted to the manufacture and repair of frogs, crossings, switches and switch accessories, signal lamps and track tools, are located at Tomah, Wis., in connection with the division shops of the bridge and building department. The policy of manufacturing this line of material has been followed by this company for a number of years and the officers in charge appear to be very well satisfied with the results that have been shown. The shop was located at Humboldt avenue, Milwaukee,

center bay handling all heavy material and serving all the heavy machine tools. Work in the side bays is facilitated by 2 ft. gage tracks connected by two cross tracks with turntables at all intersections. A number of air hoists are also provided at convenient points for handling material to the machines.

The stock of rails, fillers and other heavy material is kept in the yard adjacent to the rear of the building. It has been the practice to have most of the rail needed in the manufacture of frogs and switches sawed to standard lengths in the com-



Exterior View of Chicago, Milwaukee & St. Paul Frog and Switch Shop.

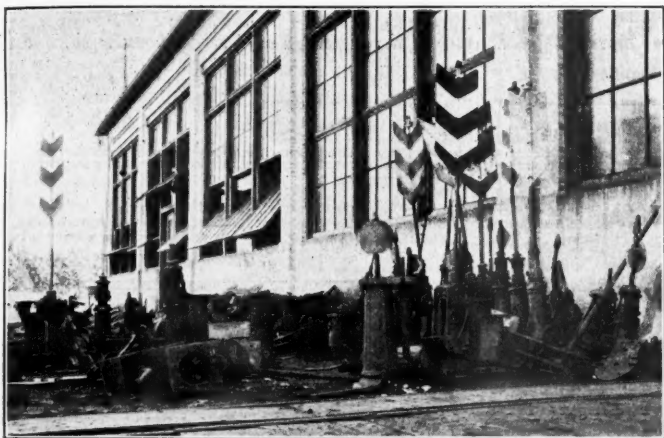
until about January 1, 1908, when the new shop was established at Tomah. The building is 350 ft. long x 110 ft. wide, the framework being of wood and the walls of brick carried on concrete foundations extending up to the bottom of the windows. The shop is divided endwise into three bays by two lines of columns supporting the roof trusses. The middle bay is served by a standard gage track which extends through double doors at both ends of the building to the storage yards in the front and rear. A five ton electric crane traverses the full length of the

pany's rail mills at Savanna, Ill., only one cutting-off saw being in service at the Tomah plant. A second saw is now being installed, however, which will make it possible to handle practically all of this work at the shop, saving the haul from Savanna and the additional handling, and also reducing the stock of sawed rails in the yard. The old saw was of the type which uses inserted teeth and operates at low speed while the new one has a solid blade and is designed for high speeds. These saws are housed in small separate buildings just outside



Material Yard and Scrap Piles, Showing Also the Locomotive Crane for Handling Material.

of the main shop building and adjacent to the track serving the center bay of the shop. A five ton locomotive crane is used in the yard to handle rail and scrap and to switch cars in the shop and yard. A special hook has been developed for use with this crane in handling dismantled scrap frogs, switches and guard rails which have been piled on low rail skids. The



The Condition in Which Material for Repair Reaches the Shop.

hook consists of two rails bent to a V-shape, spread at the bottom and attached at the top to a ring. This hook dips under the pile of scrap, lifts a load of three or four tons and dumps it automatically into a gondola car from the side, loading scrap with a rapidity equal to that of a magnet with the added advantage that the hook dumps the rails into the car straight.

The shop tool equipment consists of 12 frog and switch planers, six of which are individual motor driven and the rest group belt driven; two 48 in. draw cut crossing shapers, individual motor driven; two No. 4 and one No. 5 double end punch and shears, individual motor driven, for shearing rail flanges, cutting up and punching frog and switch accessories,

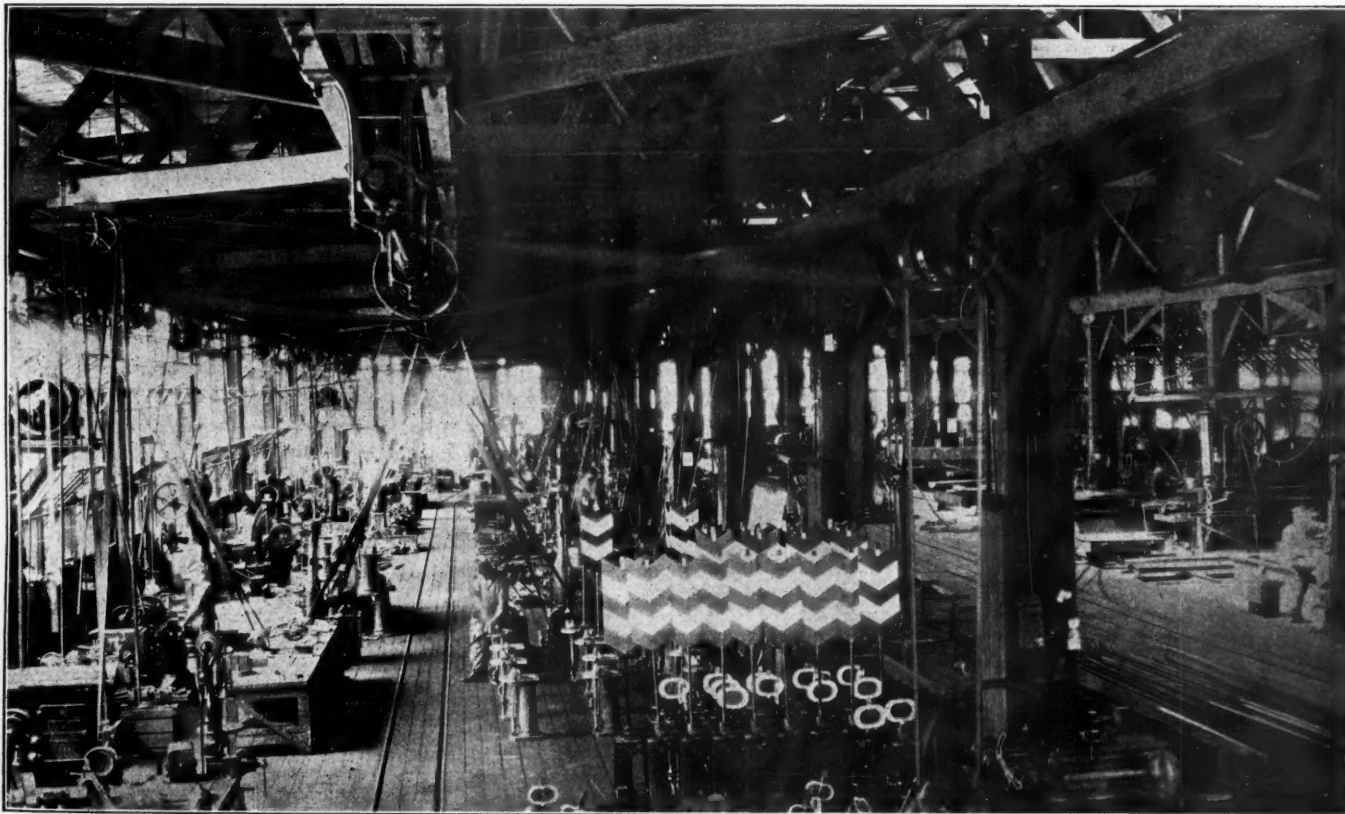
etc.; one forging machine for pressing switch riser plates, spring frog parts, switch stand throws, switch rod brackets, etc.; two steam hammers for forging track tools, compromise angle bars, crossing knee braces and fillers, utilizing in many cases old car axles shipped from the company's car shops; four late pattern lathes; four 3 and 4 spindle drills and a number of other single spindle drill presses for special purposes; two rail benders, individual motor driven, and one No. 9 blower, driven by a 30 h. p. motor serving about 12 blacksmith fires. There is also a line of other tools for special purposes, including bolt headers, bolt cutters, grinders, shapers, screw machines, milling machines, etc. The tin shop includes a power press for blanking out



General View of Tin Shop.

parts, power shears and a line of small hand operated tools adapted to the work of making semaphore lamps, switch lamps, train markers and classification lamps. Trainmen's lanterns are also repaired in this shop at irregular intervals when a sufficient number has accumulated.

Among the special devices installed by Mr. Stutsman, the

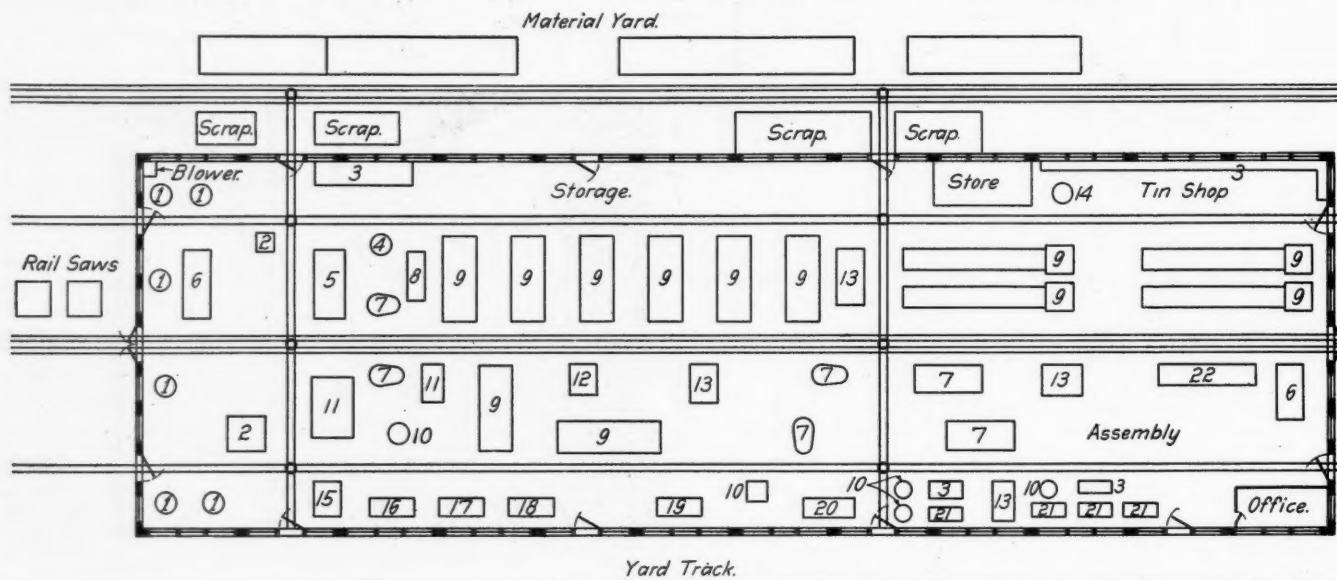


Side Bay of Frog and Switch Shop.

superintendent; are the following: An old planer converted into a grinder for grinding manganese steel frog castings, etc., by having an individual motor driven emery wheel attached to and suspended from the housings of the planer, the work being clamped to the table and fed under the wheel; and a long shallow tank to be filled with water which can be heated with steam for the dipping of rails during cold weather to take out the frost and prevent breakage during the bending of the rails. A small store building serves for the storage of

end to be thrown out of service when necessary, and each driven by a 40 h. p. motor. The six large planers are equipped with 30 h. p. motors and the traveling crane has 5, 10 and 15 h. p. motors. The shop and yards are lighted by arc lights which are wired two in series on the 220 volt circuit. The forging machine and the pneumatic hoists are operated by compressed air supplied from the power house at 90 lbs. pressure.

During the construction of the Puget Sound extension, and



Plan of Frog and Switch Shops on the Chicago, Milwaukee & St. Paul.

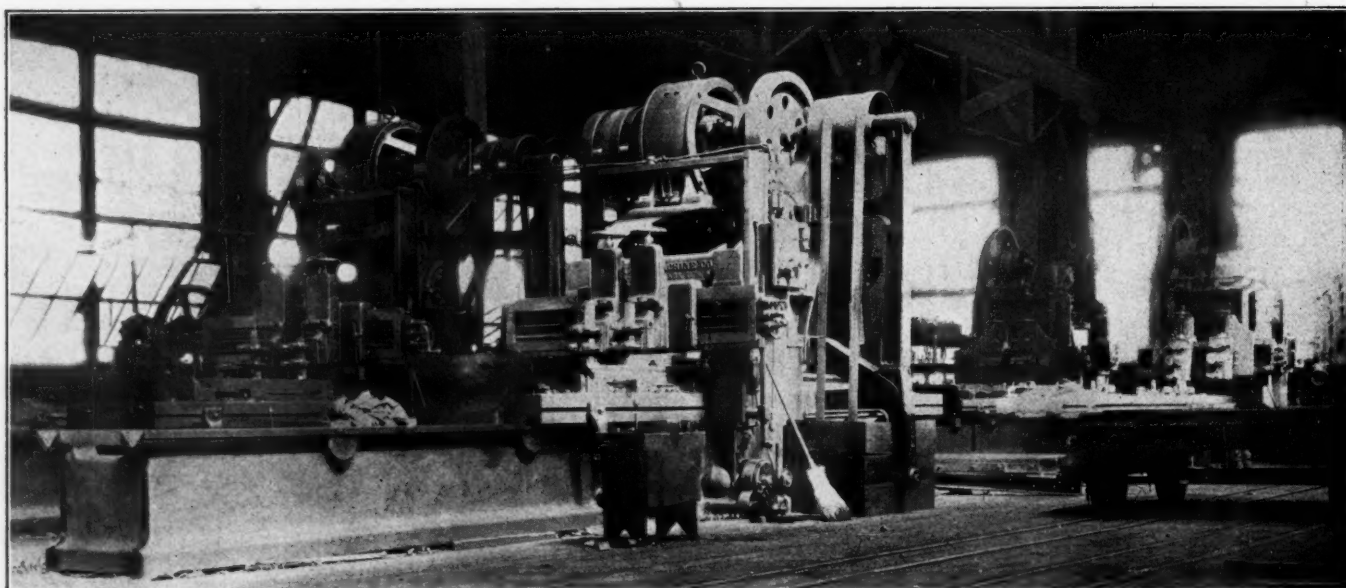
ARRANGEMENT OF MACHINES.

- | | | | |
|---------------------------|-----------------------|-----------------------------|----------------------|
| 1. Blacksmith fires. | 7. Drill presses. | 12. Horizontal drill press. | 17. Bolt cutter. |
| 2. Steam hammers. | 8. Slotter. | 13. Shapers. | 18. Tapper. |
| 3. Benches. | 9. Planers. | 14. Power press. | 19. Screw machine. |
| 4. Tool grinder. | 10. Drills. | 15. Forging machine. | 20. Milling machine. |
| 5. Single end rail shear. | 11. Punch and shears. | 16. Bolt header. | 21. Lathes. |
| 6. Rail bender. | | | 22. Dipping tank. |

small material needed for the operation of the shop and a large tool bench is provided for keeping all extra tools and special equipment.

The electricity for operating the plant is furnished by a power house which serves also the bridge and building shops. The current is received at 220 volts d. c. There are four line shafts 150 ft. long, each one broken in the center to allow either

for the past two or three years, on account of the large amount of second track and new yard work, the demand on the frog and switch shops has been unusually heavy. The output of these shops, which has just about met the requirements, has been approximately 5,000 sets of split switches complete with all accessories; 4,000 rigid frogs; 1,000 spring frogs and 4,000 switch stands of various designs per year. The output of the lamp



Four Large Planers with Individual Motor Drives.

shop is approximately 7,000 new signal lamps per year and almost an equal number of repaired lamps. The forge shop manufactures a large portion of the new and repaired track tools used on the system. The total value of the manufactured product has averaged approximately \$350,000 per year for the past three or four years with an average pay roll of \$55,000 per year, the relative cost of labor and material being about 16.5 per cent to 83.5 per cent. This low ratio of labor to material is due, principally, to the fact that Mr. Stutsman has specialized in this work and that mechanics are developed according to their capabilities into specialists in certain classes of work, making it unnecessary to employ a large number of high priced all-around mechanics.

The principal advantages in the operation of this shop have been found to be the economy effected and the service it is able to render in affording quick deliveries of material. The output of the shop is so controlled that a dozen or more complete turnouts with switches and all accessories can be completed and shipped within a day from receipt of the order, if necessary, or an emergency crossing can be furnished in an equal length of time. In a number of cases the cost of manufacturing material is said to have been very materially under the lowest bid of manufacturers for similar work. A further advantage is that all scrap switch material and crossings are sent to the shops to be dismantled and classified, allowing the recoverable parts to be used to the best possible advantage. The same is true of old signal lamps and track tools, which are sent to the shop to be scrapped or repaired as their condition warrants.

The force required to carry on the work varies from 100 to 140 men. The office force consists of one clerk and one draftsman. From engineer's surveys the draftsman makes shop drawings of crossings, which give the necessary information for cutting and planing the rails and assembling the parts without giving any unnecessary details or waiting to make blue prints.

The shops are operated under the general supervision of G. B. Woodworth, inspector of rail, Ira G. Stutsman, being superintendent in direct charge of the plant. We are indebted to both of them for the privilege of inspecting the plant and for much of the data included in the above description.

BALTIMORE & OHIO LABOR BUREAU.

As announced recently in these columns, the Baltimore & Ohio has organized a free labor bureau in connection with the maintenance of way department for the employment of skilled and unskilled labor for all grades of railway service, and especially for track work. This bureau is in charge of an officer of the road with the title of labor agent, having headquarters at Baltimore. Besides the central office, branch offices have been established at Philadelphia, Washington, Cleveland, Cincinnati, Chicago, Louisville and Richmond. This bureau was organized on August 1, and in spite of the scarcity of labor throughout the country 10,421 men have been sent out from the various agencies where needed. The special advantage of such a bureau with branch offices throughout the country lies in the fact that a local shortage in one locality may be supplied from a surplus at another point. In this regard it is interesting to note that men were sent from each of the offices to a majority of the different divisions, and that the largest number shipped from one point, which is Philadelphia, was 2,970 men. In addition to securing men for the maintenance department, material assistance has been rendered other departments and to contractors who experienced difficulty in securing ample forces. Out of the total of 10,421 men supplied 649 have been secured for the motive power department, 395 for the transportation department, 144 for the store department and almost 500 for different contractors engaged in company work. In all a total of 1,691 men have been supplied to other departments.

When gangs of laborers are organized and ready to be sent out on the job, they are placed under the care of a man known

as a labor pilot who is connected with the agency, and who accompanies the men to the job and makes the necessary arrangements for starting them at work. When more than 20 laborers are sent at one time, a special car is provided for their accommodation, which is attached to regular trains.

THE MAINTENANCE OF TRACK.

By T. THOMPSON,

Roadmaster, Atchison, Topeka & Santa Fe, Joliet, Ill.

It is hard to imagine a mechanical appliance more crude and at the same time more complicated than the modern railway track. The improvement of the locomotive's highway has certainly failed to keep pace with the rapid advance of the locomotive itself. True, the field is not so extensive, yet the opportunities for improvements are decidedly in evidence.

The most important requirement in maintaining good track surface and line is sufficient drainage, without which all efforts are wasted. The roadbed should be built up so that the shoulders will be wide enough to permit the proper sloping of the ballast and prevent it from rolling down the embankment or into the ditch. On the other hand the shoulders should be a trifle lower than the sub-grade itself so the ballast will drain freely. Ditches deep enough simply to drain the ballast are better than none at all, but they will not aid materially in maintaining good surface. All ditches should be deep enough to properly drain the sub-grade. The bottom of the ditches should be from two to three feet below the bottom of the tie, depending upon the nature of the soil. If properly constructed such ditches will keep the roadbed fairly well drained and aid materially in maintaining the surface. They will also reduce considerably the liability of the track to heave during the winter months.

On double track sections the ballast, unless very porous, should be dressed off to form an even shallow gutter between the tracks. From this gutter small cross drains should be run to the side ditches, the object being to carry the water off as rapidly as possible and prevent the softening of the roadbed and consequent damage to the surface of the track. Much water can in this way be disposed of which would otherwise soak into the roadbed.

Whenever possible railway crossings should be thoroughly drained by using a good depth of cobbles or broken stone, covering this with the ordinary ballast and putting in drains to carry off the water from the bottom of the pit. Sufficient surface drainage should also be provided so that all water, excepting what actually falls on the crossing, will be carried away at once.

Poor drainage at street and highway crossings always breeds low joints and many sections of track good elsewhere suffer from this difficulty for each successive rain produces its bad joints at these points. As a rule these joints are not only the most expensive ones to maintain, but they are also the last ones to receive attention, thus becoming a constant source of annoyance. Blind drains of cobbles or broken stone or tiles laid parallel to the track, a little below and beyond the ends of the ties leading to a proper outlet, will carry off the surplus water, avoid the puddling of the joints and save considerable work and money.

If the track is badly out of line it should be given a general lining before attempting to do any surfacing. All short kinks and swings should be lined out. Long, easy swings, although unsightly, will detract very little from the riding merits of the track, as they will produce little added friction to the rolling stock. Swings of this kind may be made less noticeable by running them out at the summit of a grade, or by adjusting them so they will be absorbed by a regular curve.

Track that is generally out of gage or wide at the joints should be gaged ahead of the surfacing. At least two men should be sent ahead to do this work, keeping a day or two ahead of the regular surfacing. The gage must be kept uniform throughout and must not be widened through frogs or switches or any other point, unless it be around very sharp curves.

Each tie must be full spiked. Rails must not be brought to

gage by "drawing" the spike, for in doing this the back support of the spike is lost and the space is left for accumulation of moisture, which of course is detrimental to the tie. If necessary to draw the rail to gage, a bar should be used to force it to its proper position. Ordinarily the spike should be driven two inches from the outside of the tie. All holes from which spikes have been withdrawn must be plugged. All old spikes that are to be redriven must first be straightened, and no spike that is throat-cut to exceed one-sixteenth of an inch should be used again in main track.

When resurfacing becomes necessary on account of center bound track, it should be commenced at one end of the section, preferably at the end farthest from headquarters, and should be continued through to the other end. The first thing in the morning a couple of men should be started fastening down the spikes. If this is not done some of the ties will not come up with the rail when the jacks are applied, but will hang low, and in this way result in uneven surface and imperfectly riding track. All joints should be full bolted and every bolt must be tight. The track should be surfaced out of face. Picking up low joints is not surfacing. Economy in this work depends upon the judgment of the foreman in bringing the track to proper surface without unnecessarily disturbing the general level of the track. When not working to grade stakes it is best to work to the high points in the surface, sighting through from one high point to the next. No more track should be disturbed than is absolutely necessary to regain a comparatively even grade, as a constant disturbance of the ties in the bed causes the track to settle and such settling will necessarily not be uniform. Uneven settling of track often occurs for short distances and creates a problem requiring careful attention. To handle such cases economically and effectively, it may be easier to cut down one or two high points than to raise several rail lengths out of face. To know just where to begin on a rail to be raised and to know just where to set the jack to bring the rail to proper surface with a minimum application of the jack are points that are gained only by experience, careful study and thorough application on the part of the foreman.

Light sags are unsightly but do not in any way interfere with the riding quality of the track. Unless there is sufficient width of bank and plenty of ballast, such sags had better be left. In case of sufficient material and labor, however, such sags may better be removed and in that case it will be well to have grade stakes set, as it expedites the work.

Regular surfacing should be done by the regular section gang, as there is a possibility of training these men to tamp alike. Extra gangs nearly always perform this work in an indifferent manner, as the very nature of an extra gang makes it impossible to get uniform results. All the men must be taught and made to tamp alike. Foremen must insist upon this and teach their men how to do this work properly, for it is of the utmost importance that all ties be tamped systematically and that uniformity should be maintained. The men handling the track jacks should be taught to set them plumb when raising track, so as to avoid throwing the track out of line.

Lining of track should not be undertaken during the heat of the day, but can be done best during the early morning, or possibly in the evening. In connection with surfacing, the lining should be done every evening. The ballast can be roughly filled in, after which the piece of track surfaced during the day should be lined. It will generally require about six men with lining bars to do this work. The men should be instructed not to set the bars under the rail far enough to get a lifting hold, as in that case there will be a tendency to disturb the surface of the track by raising up on it. All kinks and short swings should then be lined out. It will generally be found necessary to rough in the line and then go back over it and put on the finishing touches.

Filling in and dressing off the ballast should be attended to

every evening after the surfacing and lining has been done. All the ballast should be carefully saved, filled in between the ties and dressed off smoothly to present a tidy and finished appearance. The method of dressing the ballast depends upon the kind of material used. The amount of material to be left at the ends of the ties depends entirely upon the nature of the ballast and must be so adjusted that it will admit of free drainage and at the same time help to hold the track to line as much as possible. Very porous material will permit the tie to be buried its entire length, while other material will have to be sloped toward the end of the ties to permit free drainage. Broken stone or slag may be filled in level with the top of the ties for the entire length of the ties if desired, giving it such a slope from the ends of the ties to the grass line as the standard cross section may call for. Gravel, cinders or sand should be filled in level with the top of the tie, not above them, and sloped slightly down toward the rails, so that a shovel can be passed through under the rail, leaving the ballast about an inch below the base. The slope should be continued to the grass line, leaving the end of the ties about half buried. Burnt clay or natural earth should be slightly ridged in the center of the track, level with the top of the ties, sloping evenly to the ends of the ties and leaving the ends practically bare, so that all the water may readily pass off. Care must be taken to leave a good clear space below the rail between the ties. The material should be dressed off as smoothly as possible and firmly packed with the foot or otherwise.

Transitions or easements should be used on all curves from one degree upward, and where the speed exceeds 60 miles per hour, on all curves from 30 minutes up. Transitions should also be used between curves of different degree in the same way they are used between tangents and curves.

The length of easement or transition should be the same as the distance in which the curve elevation is run out, and since the elevation depends not only on the degree of the curvature, but also upon the speed of trains, the transition should also vary in length, dependent upon the degree of curvature and speed of trains.

On roads where the freight traffic predominates and passenger trains do not ordinarily exceed a speed of 40 miles per hour, an elevation of three-quarters inch per degree may be used. The maximum elevation should not exceed five inches. On the ordinary road, handling a mixed traffic and where passenger trains do not exceed a speed of 50 miles per hour, an elevation of one inch per degree probably will be a good compromise, with a maximum elevation not to exceed five or six inches. On roads where fast passenger service is a specialty and the speed of such passenger trains ranges from 50 to 75 miles per hour, an elevation of from one and one-half or two and one-half inches per degree may be found necessary, according to the varying conditions, with a maximum elevation not exceeding seven inches.

Bad line is more noticeable on curves than elsewhere. The natural tendency is for track on curves to go outward. If the outer rail is not sufficiently elevated, each passing train tends to force it just a little farther out. Then the trackman's unconscious and unconquerable desire is to line the track out, which tendency of course produces a sharp place or elbow at each end of the curve, in order to get back to the tangent. If the expansion between the rails has not been rightly proportioned, the track is difficult to keep in line and during hot weather is liable to buckle. Usually the trackman resorts to his old trick and lines out. If the expansion has not been provided for it should be done at once by cutting out sufficient rail and then lining the curve in to the center stakes.

It is often difficult to maintain gage on curves. In such cases it is best to resort to the use of tie plates. Tie plates, properly placed and of sufficient weight, will maintain gage under the most severe tests and do not injure the ties by excessive spiking, as is the case with rail braces.

CONTRIBUTIONS TO THE SAFETY CONTEST.

Methods of Reducing Accidents in the Maintenance of
Way Department as Described by the Various Contestants.

FIRST PRIZE—ORGANIZATION TO SECURE SAFETY.

By G. W. ANDREWS,

Inspector of Maintenance, Baltimore & Ohio, Baltimore, Md.

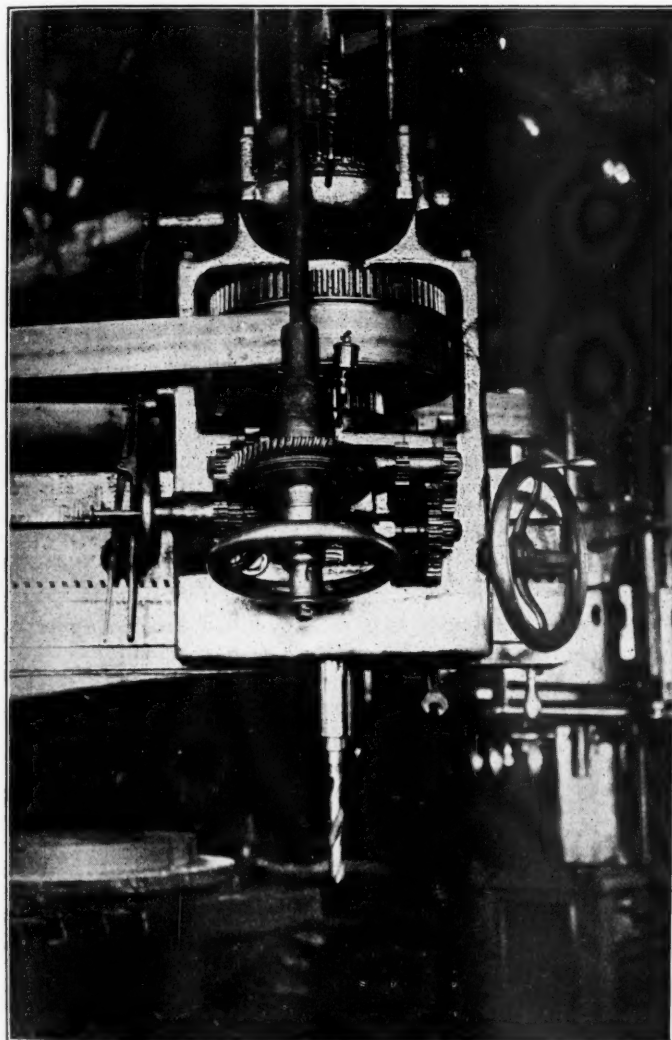
In 1911 the management of the Baltimore & Ohio decided to use every available method to educate their employees to contribute methods for reducing the number of accidents. This work is being carried out by the general safety committee, composed of general officers from each of the following departments: legal, operating, maintenance of way, claim, relief, motive power.

On each division what is known as the division committee has

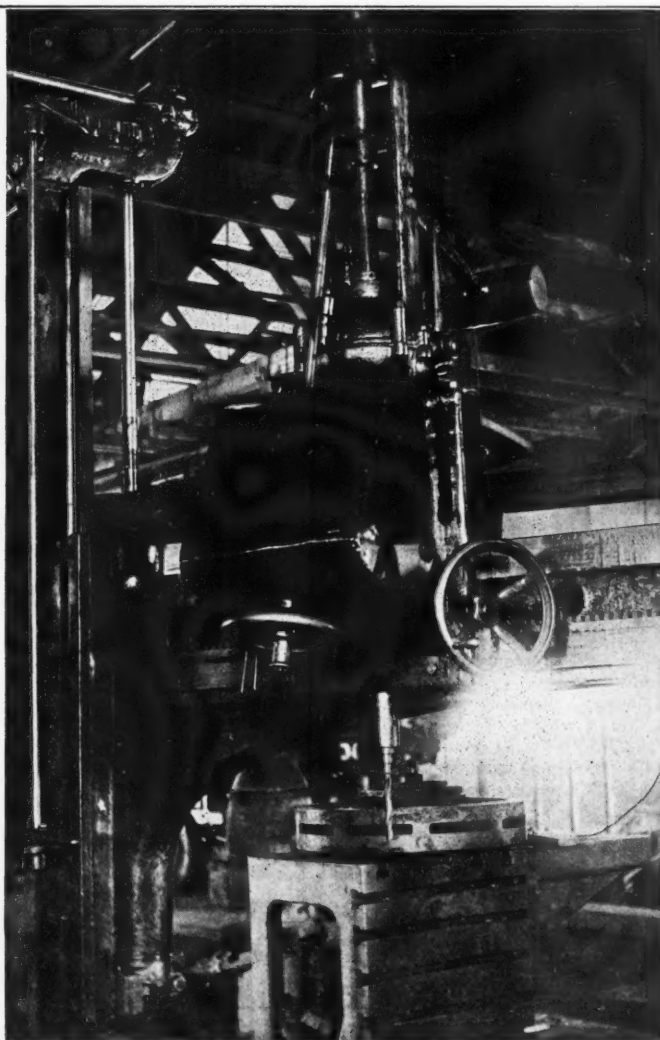
at some central point on each division. At these meetings division officers are required to be present whenever their duties will permit.

The division committeeman is required to give special attention to defects or other conditions that might cause an accident and remedy them if possible. When an accident occurs, the committeeman in whose department it occurred is required to obtain all possible information and as far as possible make a personal examination on the ground, ascertain the exact cause and endeavor to study out a plan to avoid similar future accidents.

Division committeemen are required to make reports to their chairman at least once each week with recommendations, copy



Drill Before It Was Fitted with a Safety Guard.



Drill Safeguarded to Protect the Workmen.

been appointed, consisting of the following: division superintendent, assistant superintendent, master mechanic or train master, chairman, one man from each of the large terminal shops and a representative from each of the various departments. In this case the maintenance of way department is represented by either the assistant division engineer or the master carpenter.

The term of service of the general committee is unlimited, but that of the division committees is limited to six months.

The total number of division and shop committees is 26 with a total membership of 406. The general and division committees meet once each month; the former at Baltimore, and the latter

of same being forwarded direct to the chairman of the general safety committee. Any recommendations that possess sufficient merit and which can be carried out by division officers must be put into effect. Where the cost exceeds the authority of the division officers the matter must be referred to the general safety committee, who will give it mature consideration and if found worthy necessary authority is requested and obtained. All personal expense incurred by the committeemen is paid by the company, including all time lost by those working for daily wage.

The meetings of the local committees are attended by one or more of the general safety committee whenever possible. Period-

ical meetings, to which the general public are invited, are held by the general safety committee in the various towns and cities along the line of road, usually at night to enable employees to bring their families. At these meetings the work being done is described by able speakers with the aid of stereopticon views.

To instill "Safety First" ideas in the men our local committee-men are requested to talk safety at every opportunity, discuss recent accidents and consider methods to prevent similar occurrences. Monthly bulletins are issued by the general safety committee showing how accidents occur and how to avoid them.

Each committee member is required to make a special study of conditions in his department and is also instructed to note and report any condition that he may find unsafe on any other work.

The following rules have been printed in English, German, Greek, Hungarian, Italian, Lithuanian, Polish, Slovak, Swedish, Bohemian, Croatian or Austrian and Bulgarian, issued in book form and distributed to the men. Each foreman is required to give one to every employee under his supervision and wherever possible ascertain that the book is read and understood. When an employee is unable to read it must be read to him until understood.

1. It is the duty of every employee working on or about the tracks of this company to exercise great care to avoid injury to himself and others, and nothing in these rules is to be so construed as to relieve any employee from performing his full duty in that respect.

2. Employees must examine and know for themselves that tools, material, etc., which they must make use of in performing their duties, are in proper condition. If not, they must put them so, or report them to the proper person and have them put in proper order before using.

3. In handling rails, ties and other heavy materials, foremen should specially caution their men to use unusual care to avoid injury.

4. On the approach of a train, employees who are working on or about the track must move to a place of safety, standing clear of all running tracks. They must not walk or stand on the tracks, except when necessary for the proper performance of their duties.

5. Watchmen, patrolmen, track walkers and others on duty which makes it necessary for them to be on the track, where there are two or more tracks, should, when practicable, travel against the current of traffic, keeping a sharp lookout in both directions for approaching trains.

6. Foremen or others in charge of employees working on or about the tracks must instruct their men to be alert, watchful, and keep out of danger; and will take the necessary precautions to see that all men working under their immediate supervision receive warnings of approaching trains in time to reach a place of safety.

7. When working on tracks in places where approaching trains cannot readily be seen because of permanent obstructions to the view, curves, or temporary obstructions, such for instance as fog, storms, snow, or engines or cars, extra precautions must be taken to warn the men of approaching trains.

Foremen, watchmen and others in charge of gangs or squads of workmen must provide themselves with a whistle, and should use the same in warning men when working in places where approaching trains cannot readily be seen. These whistles are furnished by the company.

8. As an extra precaution, when necessary to place a watchman at some distance from the men at work on the tracks, or in such location that his signals may not be understood, additional watchmen should be placed so that signals can be passed to the men at work and return signals obtained. In case return signals are not received and understood, the watchman must signal the train to stop.

9. When large numbers of inexperienced men are working on the track, they should be divided into small squads, and each squad placed in charge of an experienced man, and all necessary additional precautions taken to prevent accident.

10. Employees working in a tunnel or near the end of the same, when a train approaches from either direction, must stand clear of all tracks, and if in the tunnel, must occupy the manholes or refuge niches.

11. In tunnels where clearance is limited and no manholes or other places of safety provided, foremen must arrange with the superintendent for the use of track and work under flag protection.

12. Employees are required to carry a lantern or torch when passing through any tunnel where men cannot readily be seen.

When an entire gang is working close together, an adequate number of lights should be used, but not less than two.

13. Hand cars or hand trucks must not be used at night, nor in the daytime when approaching trains cannot readily be seen by reason of fog, storm or snow, except by permission of the superintendent.

14. Trains will be run in either direction, on any track, whenever necessary or expedient, and workmen will be governed accordingly.

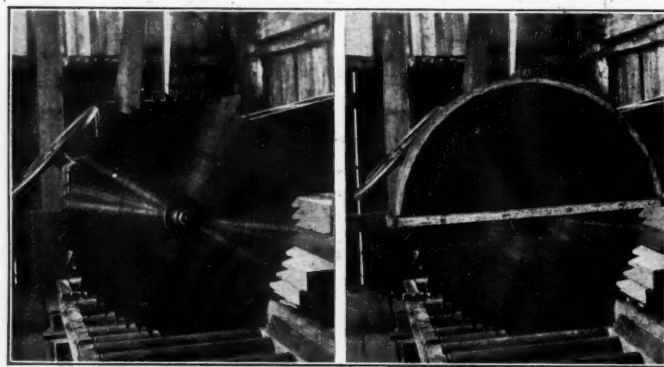
15. Any employee, who, while on duty, is careless about the safety of himself or others, or who disregards warnings, will be disciplined.

16. Employees whose duties require them to work on or about the tracks must supply themselves with a copy of these rules.

In addition to the rules named, general instructions have been given governing the use of hand and gasoline motor cars, in which reverse movements are forbidden on double track and on single track permission must be obtained from the nearest telegraph office or telephone before proceeding. Close attention must be given to movement of trains and in no case must telegraph or block offices be passed without first ascertaining the location of trains in both directions. All frogs, switches, guard rails and crossings must be properly equipped with guards or blocks. On bridges located in yards, the decks are being covered with either wood or solid concrete decks, with side walks and hand railings. On a bridge near a turnout, water station, train order office or passenger or freight station, a platform is placed on one or both sides as conditions may require. Where platforms are not considered necessary, refuge bays are installed. On turntables, walkways and railings are being provided.

Overhead bridges are being raised to a minimum clearance of 22 ft. wherever possible. Where this is not possible warnings or telltales are placed. For sidewalks of the old and narrow tunnels, overhead structures and other points where side-clearance is close a warning is placed at each end or side of the structure protecting all tracks. In many cases the clearance has been increased by widening tunnels to standard width, cutting back the overhang on station roofs, increasing the span length of overhead bridges and cutting away projections in rock cuts.

Cranes operated by air or steam have been furnished to nearly



Saw Before It Was Safeguarded.

Guard on Saw to Protect Workmen.

all of the divisions for handling rails, frogs and switches, and others are now being built in our maintenance of way shops at Martinsburg, W. Va. By use of these machines the danger of injury in handling this material has been almost entirely eliminated. All track and bridge tools such as cutting chisels, punches, drift pins, rivet busters, etc., must be dressed on both striking and cutting ends to avoid spalls or chippings flying off and injuring the men.

All ties and timber either in yards or along the line of road must be piled carefully and uniformly and sufficiently far from track for ample clearance under any and all conditions. Electric lighting is installed in all large yards, giving better protection to track men working at night as well as trainmen. This line of work is followed closely and additional lights installed wherever found necessary to increase safety.

This company has large maintenance of way shops at Martinsburg, W. Va., where are built frogs, switches, guard rails, bridges and miscellaneous work of every character required for track, bridge building and water station work. For this work large and varied machines are required. On every part possible protecting shields have been placed as shown in two of the accompanying cuts.

The resultant effects of our work have been extremely gratifying in the large reduction of accidents. With the plan of education we are now following, keeping up incessantly the advising and warning as to the necessity for exercising care in

handling material, tools, etc., accidents from this cause will be very materially reduced. A monthly magazine is now being issued under the directions of the general safety committee in which questions of safety are discussed and accidents published, giving cause and suggestions for elimination of similar ones.

SECOND PRIZE—SAFETY FROM A FOREMAN'S VIEWPOINT.

By L. J. EVANS,

Foreman, Western Pacific, Stockton, Cal.

For a number of years I have made it a study to increase the efficiency of my work, both in safety to track employees and in economic handling of track work, and the following are a few of the safety methods I use in daily practice.

In building spurs or other tracks where rails are distributed by push cars I never allow the men to "walk the rail," that is for two men to alternately move the ends of a rail until it reaches the edge of the car; neither do I allow them to take hold of the "ball" of the rail to draw it to the edge of the car. When I am ready to distribute the first push-car load I always place the men in front of the rail and instruct them to place the palms of their hands under the base of the rail and their thumbs on the upper side, and when the word is given to draw the rail toward them to the edge of the car, then to pick up the rail with rail-tongs and carry it to where it is to be placed in track. By using this method I have not had a man injured in 15 years, while I know of numerous accidents which have occurred through using the other methods.

When in charge of steel gangs changing steel, while the gang is full spiking and bolting I send four men with tongs and one man with a shovel ahead, the shovel man to raise a small mound of earth or gravel and the four tong men to lift the forward end of the rail upon the mound. Then I have the strappers who are not engaged in full bolting follow the tong men, placing the angle-bars loosely bolted on the raised end of the rail, and when laying the rail, I have the shim man use a light bar about two feet long to spread the angle-bars to enter the rail being laid. By this method I find the strappers do not injure their fingers, which is a frequent occurrence when angle-bars are applied after the rail has been laid in place.

In spiking I always instruct the spikers to hold the spike so the thumb and fore-finger will be about one inch from the point of the spike, the head of the spike resting (as I once heard an Irishman remark) "in the heel of his fist." By this method it is almost impossible to injure the fingers when "tacking" the spike.

In tamping ties with tamping bars I never allow two sets of tampers to work closer than half a rail to each other and compel them to move in the same direction. I know of an instance where a man had several ribs broken where tampers were allowed to work toward each other.

In loading frogs or other heavy, cumbersome material, I put up a set of skids, fasten a rope to the object to be loaded, then place a man on the car who takes a turn of the rope around a car stake on the opposite side of the car. As the other men move the frog or other material forward on the skids he takes up the slack in the rope, thereby eliminating the danger of sliding back after each movement. The men are confident that they are in no danger and the work progresses more rapidly.

When using a work train and loading rails by hand, before we begin to load a car I place in the pockets on the side of the flat car two short stakes which project not more than six inches above the floor of the car, which prevent the rail from "kicking back" while being thrown upon the car. This method is invaluable in loading rails in a narrow cut.

Realizing the fact that many employees are fatally or seriously injured while sitting on the end of a car, I have made it a point for many years when on work trains not to allow the men to sit less than six feet from the end of the car, and I insist upon their sitting down while the train is in motion. I have made it a rule

to dispense with the services of any laborer who persists in walking from one car to another while the train is in motion, and by strictly enforcing it I have eliminated personal injuries to men while riding on work trains.

When we began distributing gravel during the early part of the past summer it was rarely that two cars in succession had the dump levers on the same side. I asked both trainmaster and roadmaster to have the cars when empty switched or turned on a wye so as to have all the levers on the west side. The reason for this was that the prevailing wind blows from the west or northwest. I also asked to have the engine headed south, and as we were working north the engine was placed on the north end of the train. This placed the engineer and train crew in position to give and take signals immediately when called for. All the men concerned in the dumping were out of the dust, and as all worked on the same side all the time, there was no occasion to climb from one side of the train to the other. During the entire season no one was injured.

When going to and from work on hand cars I place the water keg and track-jack on the rear end of the car to prevent a derailment of the car and possible injury to the men in case either jack or keg falls from the car.

As a precautionary measure against injury to other persons I instruct my men not to pile track or other material nearer than six feet from the nearest rail.

I furnish my utility man with a garden rake to gather all loose cobble stones from between tracks in the yard. I saw an accident in which a switchman was thrown under a car and lost a leg by stepping on a loose stone while "cutting cars" which were in motion. While this accident occurred a number of years ago, the horror of that scene is recalled every time I see a loose cobble stone.

When a slide occurs and I am in charge of clearing it I place a watchman where he can see every movement of the mass, and it is his duty to give warning of every movement, no matter how slight. By using this precaution I am sure that many serious accidents have been prevented.

As nearly all roads are supplied with ditchers I believe that when a large amount of new rail is to be distributed and old rail picked up it would be advisable to use one of these ditchers to do this work, both from the financial and safety standpoints. I would prefer the ditcher to a rail-loader which is equipped with a boom that is swung by hand with ropes. The ditcher is equipped with a rigid boom and the whole machine is moved on a circular base which eliminates the danger of the boom swinging back and injuring the men on the car or on the ground while working on the low or the inner side of a curve. As these machines are not in use during a portion of the year they could be put to good use in large material yards unloading and piling heavy material at the time the yearly supply is being received, thereby preventing many injuries to those who are now doing this work by hand.

I would suggest that a circular be issued each month giving a list of all the accidents which occurred during the previous month and the cause of them. I would further suggest that the foremen be called into headquarters two to four times a year to discuss the cause of these accidents and give their ideas as to the best methods to prevent their recurrence. I would propose that our claim agent be with us and compare his preventive ideas with ours. While the claim agents are selected on account of their ability to handle these problems, I believe we could give them ideas from the "ground floor" that would repay them for mingling with us.

As our track forces are almost entirely composed of uneducated foreign labor, the burden of safety falls heavier upon the shoulders of the track foreman than any other man in the service; upon his thoughtfulness, his ingenuity and his watchfulness depend the safety of his men; the laborers rarely if ever beforehand realize how they are endangering their own lives and the lives of others by leaving partly undone some portion of the work they are called upon to do.

EVERY SECTION GANG A SAFETY COMMITTEE.

By G. B. JENNINGS,
Frisco Lines, Ft. Scott, Kan.

The plan of having a committee of foremen make a trip over the division at regular intervals is an excellent one, but as each gang has its own problems to solve, the foremen's committee should be carried a step farther. Each gang should be a sub-committee with the foreman as chairman and should discuss the near-accidents—those that are averted by a seeming miracle—as fully as those that actually occur, and the danger should be made plain to all. The escape may lead to a repetition of the act, or set an example for others.

These near-accidents may occur in catching rides while a train is passing slowly by the point where men are working, or from working in front of an approaching train until it is too close for safety. The writer has seen both these incidents occur, happily without injury in either case, but near enough to merit the censure that followed each.

There is generally ample time during the noon hour for each gang to hold an informal meeting, discussing the accidents and near-accidents that may have occurred in their midst, as well as those that are bulletined. They should also discuss accidents that they may have seen or heard of elsewhere. They should set apart one day each week for these meetings, to be known as "Safety First Day," for regular discussions. Then when the foremen's committee comes, each foreman will be prepared to meet them and may have valuable suggestions to make.

Each employee has a vital interest in this movement and should be made aware of the fact and encouraged to take an active part. It should be impressed on each one that he is expected to take an active part, and it should be the duty of the foreman to get some expression from each man. When a man understands that this movement is for his welfare as well as for others, his interest is quickened and enthusiasm is sure to follow. In the winter these meetings could be held at the home of some one of the men, and the men will soon find that the wives and mothers are interested.

With so many foreigners on the track this will often be difficult, but if the interpreter will work with the foreman this may be overcome to a great extent. The presence of so many foreigners is of itself an increased source of danger. This is due to their ignorance of working conditions and our language; also to our ignorance of theirs. Foremen should learn from the interpreter some word or phrase of caution in the men's own language, and by using it at the proper time may often avert accidents.

Especially with foreigners, a foreman should outline to the men each day's work and assign each man or group of men a certain part of the work, cautioning them against any danger likely to arise. He should explain the best way to handle the work, for the best way is also a safe way. This is especially true in the loading or unloading of heavy material such as rails, ties, frogs, switches, etc.

Foremen should arrange for daily inspection of tools, hand and push cars by a competent man. The defective ones should be laid aside for repairs, as many accidents are due to broken, worn or otherwise defective tools. He should also prohibit excessive speed with hand cars, as some one is sure to jerk on the handle bars, which often derails a car. The writer recalls one accident of this kind, resulting in a painful injury to a young Greek, who spent several days in the hospital in consequence of this carelessness. The foreman was not at fault in this case, as he had repeatedly cautioned the men against speeding. He had a large gang, necessitating the use of six hand cars, and there were not enough Americans in the gang to put one on each car. Some of the men were putting away tools and started late. In their effort to catch up they became reckless, with the above result. There was no more speeding in that gang.

These are only a few of the many daily incidents—so common they are apt to be neglected. "Take care of the pennies and the

dollars will take care of themselves" might be changed to "Take care of the details and the results will take care of themselves."

EDUCATION ALONG SAFETY LINES.

By E. M. GRIME,

Supervisor of Bridges and Buildings, Northern Pacific, Glendive, Mont.

Progress in the "Safety First" movement in the maintenance of way department lies primarily in the selection of reliable men for foremen and in their careful education regarding correct methods of handling work. It is useless to burden the foremen with a set of rules, for these cannot cover all cases, and competent men do not need them. On the contrary they must be carefully trained by example how to avoid injuries to their men. The following are a few suggestions along this line.

Get the foremen into the habit of paying close attention to all their tools or appliances, such as track or bridge jacks, tackle blocks, ropes, ladders, carrying hooks, pevies, claw bars, hand cars, etc., to see that they are in first-class condition at all times, and to keep no tools on hand or in use that are not first-class.

While the cost of work must be kept down to the minimum this consideration should not outweigh all others. Let the foremen understand that safety must be the first consideration, that time must be taken to put up proper scaffolding, that trenching must be given special attention to provide against caving, that falsework of all kinds, especially bridging under traffic, must be watched carefully, not only with regard to the safety of the track above, but also with reference to caving or settling on the workmen beneath, that the more hazardous work should be given to the more competent workmen and, in short, that it does not pay to take chances. As far as practicable these things should be pointed out to the foremen on the ground while the work is in progress.

A thousand cases might be mentioned, for every undertaking has its own peculiar conditions. However, the most important requirement of all is to select foremen who are sincere, reliable, loyal men and who are blessed with that most valuable asset known as "horse sense."

We all have our rules for minimum clearance of material or structures along the tracks, for the use of hand cars or motor cars under traffic, for the proper use of track jacks, standard methods of bridge construction, methods of flagging, etc., etc., all of which are familiar to the men. However, when the accident has happened it is usually found that some one forgot to use his head or did not apply his knowledge to the case at hand. Much of our work is routine, done over many times in exactly the same way and instructions seem superfluous. The methods are well known by all except the poorest class of laborers, and where these are employed very close supervision is required to avoid injuries. Other work is of a special nature and dangerous for some particular reason. In all such cases the method of procedure should be carefully outlined with the foreman, not necessarily to persuade them that your method is the only correct one, but to ascertain that they thoroughly understand and realize all the difficulties and know how to proceed safely as well as expeditiously.

Just as an important part of the engineer's education is the study of the failure of important structures, likewise a careful investigation into the causes of all accidents should help to avoid similar trouble. Every accident should be studied with care and a bulletin given to all foremen describing in detail the causes, the results and what precautions could have been taken to avoid the accident. Such physical phenomena as the highly explosive nature of certain gases when mixed with air, the poisonous nature of gases which may be encountered in deep excavations or tunnels, the buoyancy of timber under deep water, etc., should be the subjects of careful instruction in special cases.

One should teach the foremen to be proud of their work and endeavor to make their working conditions and those of the men as comfortable as practicable. The foremen should understand that good service is appreciated and should be given vacations

of two weeks each year with pay and transportation so they can see for themselves how other men are handling difficult work.

SAFETY ON THE TRACK.

By D. O'HERN,

Roadmaster, Elgin, Joliet & Eastern, Joliet, Ill.

We issue instructions to all our foremen not to pile any material nearer than seven feet from the nearest rail, and we see that this order is lived up to.

In loading and unloading rail we use a rail loader or steam derrick with which we use only six men and a foreman. The foreman is held responsible for any injury to the men. In loading rail on flat cars we pick one man as a leader. He sees to it that all men take hold and lift at the same time, then he gives the command to lift up high and heave the rail into the car. If all the men pay strict attention to him no one will be injured.

We have a standard guard rail with cast iron foot guards that will not allow a man's foot to get caught. We have in use a cast heel filler for switch points that stops all danger of a train man getting his foot caught.

Our frogs are all shipped from the manufacturer with fillers. We use a ground throw switch stand set back far enough to clear a man hanging on the side of a car, and our main line stands are all six feet from the rail.

We issue instructions to all foremen not to allow any man to stand between the tracks when two trains are passing each other, and not to allow them nearer than twelve feet when any train is passing.

On work trains we do not allow the train crew to start the train until all men are safely on board, and when the train is moving we do not allow the men to get off until the train comes to a full stop.

We pick up our scrap daily and do not allow any drawbars, old ties or planks between tracks over night at points where repair work is being done.

In yards such as East Joliet we have two men whose duty it is to keep the yard clear from any obstructions that may fall from cars. In loading or unloading material our yard foremen have instructions to handle men in such a way that they will not be injured.

SAFETY AS APPLIED TO THE SECTION FOREMAN.

By C. THOMPSON,

Section Foreman, Chicago & North Western, Correctionville, Iowa.

There is, I think, a good work being done by the maintenance of way department, to decrease the number of accidents, but there is still a great deal more to do. At the present time the question of foreign labor takes a very prominent part in this problem. Most of the laborers now furnished to work on the track are foreign, and the foreman must exercise the greatest caution, coupled with shrewd judgment, to prevent injuries to these men through carelessness or ignorance.

The first thing to do is to get control of the men, and the best way to do this is to get their good will. When you have done this you have a chance to mold them so as to fit them for the various kinds of work, and in this way you are in a position to prevent accidents to your crew. It is important to use the utmost care in work of all kinds where accidents are liable to occur, such as loading and unloading heavy timbers, ties or rails. This I think is almost wholly up to the section foreman and he should see that the men have a thorough understanding of the methods which should be employed in such work. All unnecessary excitement or confusion should be avoided. While working in large yards, where trains are switching, we must remember that these men do not understand the danger as we do, nor do they understand everything we say to them, and it is a very good policy to have rules by which to work and then see that they are enforced.

Section men are sometimes injured by standing too near passing trains, and again accidents happen by men passing from one

side to the other of the track in front of fast moving trains. The possibility of accidents from these sources may be avoided by the foreman explaining the danger and insisting that these things be stopped.

Track men should keep the station grounds and right of way as free as possible from rubbish of all kinds. It not only gives it a neater appearance, but the liability to injury for some one is lessened thereby. Not long ago a section crew going over the track found a track spike driven in the expansion between two rails on the main line. They investigated and found that it was the work of some children who had been playing nearby. If the spike had not been there, however, the children would never have placed it between the rails.

Never put off until tomorrow what you can do today, for the delay may cause an accident. For instance, if you are in a hurry to do a piece of work and while on your way you find a part of the fence down and stock in that particular field, do not hesitate to stop and fix that fence, for there have been cases where a passenger train has been derailed by hitting a cow and injury to people as well as loss of property resulted therefrom. If a similar accident happened from your negligence—for that is the name we will have to call it—you would always feel the responsibility for the injuries and loss.

It is a fact that the section foreman is responsible for the passing of each train over his territory, and in a measure over his neighbor's section, for there may be a brake beam dragging or a piece of flange gone, and if he were able to attract the attention of the train crew a serious derailment might be avoided.

LOCAL SAFETY COMMITTEES.

By M. GANLEY,

Roadmaster, Atchison, Topeka & Santa Fe, Argentine, Kan.

I have tried to impress upon all employees in my department the great value of the Safety habit. I have appointed a Safety committee, which includes every foreman under my supervision, and at regular intervals each of them sends in a report advising if they have noticed anything unsafe or any conditions which in their opinion might possibly cause personal injury or accidents resulting in personal injuries. This report covers other departments as well as our own. I feel that we are deriving good results from it, as it not only brings to notice little things which are readily overlooked, but also causes the foremen to be on the lookout and to take more interest in keeping their territory clear, so there will be no occasion for anyone to report anything on their sections that could cause accidents or injuries.

I have also tried keeping a check of the personal injuries for the past year, and at our monthly meetings of foremen I compare the number of personal injuries each foreman has in his gang with the record of other foremen. I find that this stimulates the foremen to do all they can to eliminate personal injuries in their gangs.

In working foreign labor, a foreman is responsible, to a great extent, for injuries received by his men. If he stays with them the greater part of the time, giving instructions in regard to handling all heavy material and doing new work, he will have very few accidents; but if he is careless and allows the men to do the work in their own way, the result will be disastrous to his men. Foreign laborers should have an instructor for every piece of work they do, no matter how small the job may be.

I have repeatedly instructed all my track foremen with reference to getting men out of the way of trains on both tracks, when working on double tracks, as it is very seldom that a man does any work while a train is passing.

It is a very easy matter to get the foreign laborers interested in the Safety movement, and they take great pride in wearing the Safety Habit buttons. I have often noticed them calling one another's attention to their Safety buttons, while handling a heavy piece of work, and I believe that if an interpreter would give them talks on the subject of Safety very good results would be obtained. I have tried to impress upon the section foremen the idea that they are the custodians of the material

THE JAPANESE AS A TRACK LABORER.*

The Sixth of a Series of Discussions of the Characteristics of the Various Types of Maintenance Workmen.

HANDLING JAPANESE TRACK GANGS.

By A. PALM,

Roadmaster, Western Pacific, Sacramento, Cal.

In many respects I consider the Japanese the best track laborers that are now employed by the western railways. They are naturally energetic and ambitious, intelligent and easily instructed, their minds being very receptive and retentive. A foreman rarely has to repeat any instructions that he has previously given them. They are of a high nervous temperament, therefore they are very sensitive. A foreman must use diplomacy in handling them, more so than with any other race. A "pick-handle" foreman is of no use in handling Japanese, as they will resent the slightest injustice or prejudice against their race. A foreman must praise their work, and by so doing he will find that the Jap will do his utmost to please him.

They are of a cleanly disposition, bathing and changing their clothes several times a week, and their camps are always found to be in a sanitary condition. They are usually allowed one cook and one camp man to a gang of 35 men or less, and an additional cook when the gang exceeds this number. The camp-man sweeps and scrubs the cars, provides fuel and water for the cooks, and keeps the grounds around the cars neat and clean.

While they are small in stature, they are robust and have wonderful vitality, their power of endurance being far greater than that of the other races which are employed on western railways. In large gangs one will find but slight variation in the quality of their work. In ballasting I have found them the most evenly balanced of any race engaged in this class of work, and they pride themselves on the neatness and thoroughness of their work. The "green ones" are taken in hand by the experienced ones, and it is only a very short time until they are as capable workers as the others. Each one possesses an English-Japanese dictionary, and as they make it a practice to learn and understand three English words each day, it is but a few months until they have mastered enough English to understand and speak it fairly well.

The Jap is loyal to the foreman who is considerate of his welfare. An instance of this came to my notice several years ago. A gang had been working for 38 hours in rain and slush clearing a slide, returning to camp at 7:30 p. m. At 11:30 p. m. a call came to go to another slide 12 miles down the line. The foreman had taken a severe cold and when he went in that evening he had taken hot foot baths and other remedies to break the cold. When he called them to go to the slide they struck, refusing to go unless the foreman would remain in camp, as they feared he would take additional cold and possibly die from it. They told him if he would remain in his car they would go with the assistant foreman, and if the assistant had any complaint to make against any of them they would not wait for the foreman to discharge such a man, but they would make him leave on the first train out. Under these conditions the foreman deemed it advisable to remain at headquarters, and the gang went to the slide. A white gang of 30 men had been working on this slide during the earlier part of the night and every one of them had quit, refusing to work for fear of rocks falling on them. The Japanese went to work with a will, and although two of them were severely injured not a complaint was made and the slide was cleared in record time.

While they are not total abstainers they are of temperate habits and it is seldom that any are found under the influence of liquor. Whenever there is dissension among them it can almost invariably be traced to gambling. Many foremen had trouble in their gangs on account of this in the days when an agent of their own nationality employed them for the railways and each gang was furnished with an interpreter. Much dissension was apparent and the cause of it usually could be traced to the interpreter, who would import into the gang a few professional gamblers who would make a pretense of being laborers by working one or two days a week, and at night would fleece the others, dividing their gain with the interpreter. As an instance of this, several years ago a Japanese extra gang was constantly changing foremen, foremen were either being transferred to other gangs or discharged, all traceable to one cause, the interpreter. No foreman who considered his reputation worth anything would remain with this gang very long. At last a foreman was selected to take charge of this gang who had been very successful in handling Japanese with the understanding that he should discharge those who in his opinion were undesirable. The first day he had a clash with the interpreter concerning the reorganization of the gang, the interpreter telling the foreman that he would have the foreman discharged just as soon as he could get a letter to the agent. This foreman found in the gang several men who had previously worked under him in other gangs. He asked them if there were any "gamble boys" in the gang; and whether gambling was conducted in the cars at night. They told him there were, and the interpreter would not allow any man to remain in the gang who would not play. To fully convince himself he made an inspection of the cars that night and found gambling being conducted just as he had been informed. The next day the foreman discharged the interpreter and eight other men whom he found conducting the games. Without consulting the Japanese agent the foreman selected a "bookman," or interpreter from the gang, instructing him that any one found gambling would be discharged. The sullenness of the men disappeared and the standard of efficiency was raised at once on a par with the other Japanese gangs.

I do not know of any Japanese being employed as foremen in California, but I am informed that they are employed as such in Utah, Nevada and Arizona. Their reports are rendered in Japanese and at the roadmaster's headquarters a Japanese clerk is employed to translate these reports. I am informed this system is a success and the men make reliable foremen. The Japanese government has restricted their emigration, and those we now have in track service in California are rapidly leaving to take up fruit raising and truck gardening, either buying or leasing the land. It is with regret we see them passing from track work.

POSSIBILITIES OF THE JAPANESE AS TRACK FOREMEN.

By J. A. OTTMAN,

Assistant Superintendent, Union Pacific, Cheyenne, Wyo.

Eliminating all prejudice that may be felt against the importation of foreign races, one must, in fairness, admit that the most practical solution of the problem of adequate track labor lies in the development of men of foreign extraction to such an efficiency that they can successfully serve in the capacity of track foremen, regardless of the fact that they are foreigners. They must be educated, not only along technical lines regarding the maintenance of track, but must also be taught to use tact and to maintain discipline, both of which are essential fac-

*Three articles in the *Railway Age Gazette* of June 21, page 1568, discussed "The Hobo as a Track Laborer"; four in the issue of July 19, page 121, discussed "The Negro as a Track Laborer"; four in the issue of August 16, page 303, discussed "The Italian as a Track Laborer"; four in the issue of September 20, page 527, discussed "The Mexican as a Track Laborer"; and four in the issue of October 18, page 746, discussed "The Pole and Slav as Track Laborers."

tors at the present time in securing and retaining laborers.

Experience with various classes of foreign labor, in this locality, which is the mountainous district of the Union Pacific, has shown that, as a whole, the Japanese are far superior to any other foreign nationality and are producing more satisfactory results. The principal and most marked reason for this is their ability to manage all classes and nationalities of labor. It is desirable, as far as practicable, to assemble workmen of the same nationality in order to eliminate discontent and factional trouble, and to create competition between the different nationalities. This has resulted, among other things, in the tendency of each to master the English language, which, of course, is highly important. Where gangs are made up of one nationality and where Greek, Austrian and Italian foremen are employed, they invariably collect laborers of their own race, and but little progress is made in learning the language. It has been found, however, on the Western district of the Union Pacific, that the Japanese have acquired an intelligent and successful use of the English language in a very few months.

At the beginning the Japanese foremen were furnished only Japanese labor, but later, because of the shortage of Japanese labor, they were furnished labor of other nationalities, so that they are now able to organize and successfully manage gangs composed of several races. The Japanese exhibit a desire to master details, are apt scholars, are always alert to duty, have a faculty of imparting their knowledge to their laborers, and seldom, if ever, repeat an error which has been once brought to their attention correctively. These characteristics do not develop in foremen of other nationalities.

To procure and successfully control laborers so they will be retained in the service, a foreman whose education has been along practical lines must be in charge of them, otherwise the influence over the men is lost, they become discouraged, and, in some instances, leave the service at inopportune times. Experience in this territory has shown that four-fifths of the Japanese can be developed into practical and competent foremen, and in much less time than any of the other foreigners. As foremen, the actual work on the ground with their men is no more commendable than their ability to intelligently render reports of labor performed or emergencies that arise.

A serious condition resulting from the diminishing supply of track labor, and particularly of foremen, presented itself forcibly on this district as early as 1902, and continued until 1906, when the Japanese foreman made his appearance. During the early introduction of the Japanese foreman the problem confronting the company was their proper training. To assist in this work, an intelligent Japanese interpreter was employed to reconstruct and interpret the reports and communications from the Japanese foremen to the roadmaster and vice versa. Since that time, however, a school gang has been organized under the direction of a competent track foreman, this gang being composed principally of Japanese laborers who had expressed their desire to become foremen, and who had displayed evidences of intelligence and capability. The success of this venture has been very marked. The Japanese who received their education in this school gang have been successfully used as track foremen, until, at the present time a number of Japanese foremen are working on several different roadmaster's districts.

At the present time there are 96 Japanese foremen out of a total of 126 on the Wyoming division of the Union Pacific, and on the Seventh district, where the Japanese laborers were first promoted to foremen, several of the then experiments are still in the service. One of the first Japanese promoted to foreman holds the enviable distinction of being foreman of the section of the Union Pacific which was awarded the premium by the general inspectors two consecutive years, the championship being still in his possession.

These facts are, I believe, conclusive evidence of the efficiency of the Japanese, not only as track laborers, but as section foremen.

THE CHARACTERISTICS OF JAPANESE TRACK LABORERS.

BY ONE WHO HAS HANDLED THE JAPS.

To get good service from a gang of Japanese a foreman must treat them as he would like to be treated himself. You cannot get good service from a Japanese by harsh words, abuse or a club. When satisfied they will go through any hardship, even go in the most dangerous quarters and take chances that few men will take. While they are small in stature and weight they make up for this by their activity. They learn any kind of work readily, making first class section or track laborers. It may be a general opinion that on account of their size they are not good for steel gangs, and while it might be well to use two men in a gang handling the rail tongs, I have found them able to do as efficient work laying 90-lb. rail as any other class. Their habits of living are very good. They are clean about their person and clothes, and most of them have a good suit of clothes and white collars, which they wear on Sundays and holidays, no matter how far from a town they may be located. They are always on hand Monday morning ready to go to work, and while they take as readily to liquor as the men in other classes, I have never seen one of my Japanese intoxicated, and as a general rule they are not a hard drinking class. Their principal food is about the same as that of white men, with the exception that they use a particular kind of sauce procured from Japan. I should judge from my observation that 50 per cent. of them are able to read and write their own name in the English language after the first three months, and 80 per cent. are able to write enough to make their wants known after one year. I have noticed that they are inclined to study reading and writing after their day's work is done, which is not noticeable in many other classes and entirely absent in some. As a rule they do their work neatly and take an interest in what they do. Of course there are inferior and undesirable Japanese laborers, but as a general rule I have found them very satisfactory.

ADVANTAGES IN THE USE OF JAPANESE TRACK LABOR.

BY F. W. GREEN,

Roadmaster, Canadian Pacific, Kamloops, B. C.

The Japanese as a track laborer, if handled properly, compares favorably with the races from southern Europe. The Jap does not like to be shouted at or abused, nor does he wish to have other than Canadian or American foremen. Give him a pleasant look or a kind word when he deserves it and he will try to give you good work.

A steady, cool-headed foreman who knows his business and judges his men can get good results from the Jap. But get a "bookman" who pulls against the foreman and the men become ugly and have imaginary grievances. They can be contrary and stubborn, and when one gets them like that it is better to disband the gang or break it up and discharge the "bookman" and the ringleaders.

They are quick to learn the work, handy and intelligent, can be used in any kind of track work from putting in switches down to cleaning up or fencing the right of way. They will do any work as cheaply as it can be done by other nationalities. Although it is an unwritten law in this locality not to promote an Asiatic foreman, I believe there are a few Japs on the coast who would make good foremen over gangs of their own nationality.

There are several supply companies who furnish labor by contract at so much per day to the railway, which is ten cents per day less to the man. This causes dissatisfaction, for the men soon find out that they do not have to pay for the privilege of working in this country. But some of the men consider they have a sure job and all they have to do is keep moving. The Japs who hire out for themselves, draw their own checks and buy their own food are the men from whom you get good service. We use them in both section and extra gang service

with good results. Where we have Japs on the section they live in bunko-houses, the same as other laborers. The Jap has very good habits. Very few of them fail to show up for work the day after pay-day. They are clean about their person, outfit cars and beds and are not subject to much sickness. They do not like the cold weather any too well, but can stand almost any amount of heat. They do not hoard up every cent to send back to their own country, but take in the show and the ball game when they have the opportunity and are fairly good sports and fond of athletics.

I do not find them any more quarrelsome among themselves than other nationalities. They buy the same kind of shoes and clothes as Canadians, and are natty in their style. They are anxious to learn to read and write the English language, and willing to pay for it. When they know a fair amount of English they are through with the contract companies and go out for themselves. In his food the Jap lives fairly well. More than half of it consists of rice and the balance is made up of meat, vegetables and cereals.

ABSTRACT OF ENGINEERING ARTICLES SINCE OCTOBER 18.

The following articles of special interest to engineers and maintenance of way men, and to which readers of this section may wish to refer, have appeared in the regular weekly issues of the *Railway Age Gazette* since October 18:

Construction of the Rock Island Short Line.—The traffic conditions which warranted the building of a closing link in a new north and south line of the Chicago, Rock Island & Pacific; the roadbed, bridge and culvert standards used on this road and other interesting problems in its construction, were described in the issue of October 25, page 791.

Wave Action in a Rail Under an Engine on a Grade.—In a letter to the editor in the issue of October 25, page 784, Paul M. La Bach commented on the clicking of spikes which can be heard in front of an engine working heavily on a steep grade, attributing this phenomenon to the nosing of the locomotive and showing by diagram a suggested explanation.

Reinforced Concrete Slab Bridge.—The design of a concrete subway for the Minneapolis, St. Paul & Sault Ste. Marie, using the mushroom system of reinforcement which has been quite widely applied in building construction, was described in the issue of October 25, page 801.

Testing Hardness of Rails by Ball Pressures.—A method of testing hardness of rails by measuring the impression made in the surface of the rail by a given pressure on a hardened metal ball, has been developed by a German company and is being commercially used on the Continent. The method and the apparatus for carrying out the tests were described in the issue of October 25, page 803.

Some comments on seasoning ties, abstracted from bulletin 118, of the Department of Agriculture, were printed in the issue of October 25, page 805.

Some interesting data on the number of union passenger stations in the United States was presented in an editorial note in the issue of November 1, page 821.

Reconstruction of the Cumberland River Bridge.—In the rebuilding of the Illinois Central's bridge over the Cumberland river, Kentucky, some unusual conditions were encountered. The handling of floods, the strengthening of old piers and the erection of the new spans; also the details of a reinforced concrete trestle approach, were given in an article in the issue of November 1, page 831.

Inspection of Steel Rails.—A paper by Robert Job, vice-president, Milton-Hersey Co., Ltd., and chemist of the Lehigh Valley, advocating more rigid inspection by railway employees in rail mills and for an increased number of tests of the product of such mills, was published in the issue of November 1, page 843.

An editorial in the issue of November 8, page 867, called attention to the increase in cost of construction work which is very frequently occasioned by the failure to secure right-of-way and have preliminary work handled before letting contracts for grading.

Lake Superior & Ishpeming Ore Loading Dock.—Three new ore loading docks have been placed in service on Lake Superior during the last year in which steel or concrete or a combination of the two have been used in place of wood as has been the custom in this class of structure. The one at Marquette, Mich., for the Lake Superior & Ishpeming, described in the issue of November 8, page 877, uses a combination of steel and concrete, which, according to preliminary estimates, was shown to be most economical.

Mechanical Handling of Baggage and Freight.—An abstract of a paper by William C. Carr, president of the Automatic Transportation Co., Buffalo, N. Y., presented before the New England Railroad Club, which gives interesting data concerning the use of electric trucks for handling baggage and freight, was published in the issue of November 8, page 879.

An abstract of the Interstate Commerce Commission's report on the New York Central & Hudson River derailment at Hyde Park, N. Y., on March 31, 1912, was published in the issue of November 8, page 888.

The Tacheometer in Railway Location.—A paper by E. R. Lewis, assistant to the general manager, Duluth, South Shore & Atlantic, published in the issue of November 8, page 889, describes and discusses the use of a tacheometer for securing accurate levels over wide areas.

COMMITTEE APPOINTMENTS OF THE ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.

The following subjects have been selected and committee appointments made for the following year:

Contracting of Maintenance Work.—John Barth (C. C. C. & St. L.), chairman; J. Burke (Erie); T. Hickey (M. C.); Guy Lowers (Erie); P. Madden (C. M. & St. P.); N. McNabb (M. C.); F. E. Crabbs (C. & N. W.).

Combined Organization of Maintenance Forces.—Emmett Keough (C. B. & Q.), chairman; B. M. McDonald (N. Y. C. & H. R.); A. E. Hanson (A. T. & S. F.); B. C. Dougherty (C. M. & St. P.); J. P. McAndrews (C. & N. W.); F. B. Adams (P. & R.); C. Linehan (C. R. I. & P.).

New Appliances.—W. H. Kofmehl (C. M. & St. P.), chairman; A. M. Clough (N. Y. C. & H. R.); G. H. Brooks (T. R. R. A. of St. Louis); J. P. Corcoran (C. & A.); Wm. Hazlewood (N. Y. C. & H. R.); W. H. Cleveland (A. T. & S. F.); C. M. Green (C. R. I. & P.).

The Use of Power Driven and Labor Saving Appliances for Track Maintenance.—H. E. Astley (N. Y. C. & H. R.), chairman; Coleman King (Long Island); J. H. Anger (N. Y. C. & H. R.); Z. B. Couch (L. & N.); J. W. Fletcher, Jr. (Carolina & N. W.); J. W. Powers (N. Y. C. & H. R.); Robert Faries (Penn. Lines).

Prevention of Accidents, Personal and Otherwise, Viewed from a Maintenance Standpoint.—J. F. Coulston (L. E. & W.), chairman; C. J. Coon (N. Y. C. & H. R.); J. J. Hughes (St. L. S. W.); Henry Ferguson (G. T.); D. F. Lynch (C. B. & Q.); G. D. Gifford (N. Y. C. & H. R.); Frank Button (C. & N. W.); T. H. Goffney (Mo. Pac.); Geo. Barnoski (C. M. & St. P.).

THE FOREMAN PROBLEM.*

BY GEORGE J. SHARKEY,

Chief Clerk, Office of Supervisor of Track, New York Central Lines,
Kingston, N. Y.

As a solution of the section foreman problem, I offer the following:

(1) Bring the rate of pay of track laborers to \$2 or \$2.50 per day, and the rate of foremen to \$80 per month, which would attract a better element of labor to track work and would hold good men when contractors offer more.

(2) Make no distinction in race. Bid with the other fields of labor for genuine and not fake or inferior labor. In hiring labor do not negotiate with the labor agent for so many Italians, but simply send for so many good workmen, irrespective of race. A man's a man for all that. If he proves to be a good man, keep him; if not, let him go. If possible employ naturalized and localized labor.

(3) Poor men not only hold back the particular work of the territory being overseen, but also the pace of the work on the whole division, as the other sections set their speedometer at the same rate as the poorest. If a man does not fill the bill, he should give place to the man who can.

(4) Change the name of section foreman to track maintainer. The term "section" is ancient and proverbially a joke. This seems to be a slight matter, but the majority of men are both sentimental and proud, and no one likes to have it said that he "works on the section."

*Received in the contest on The Section Foreman Problem, which closed March 25, 1912.

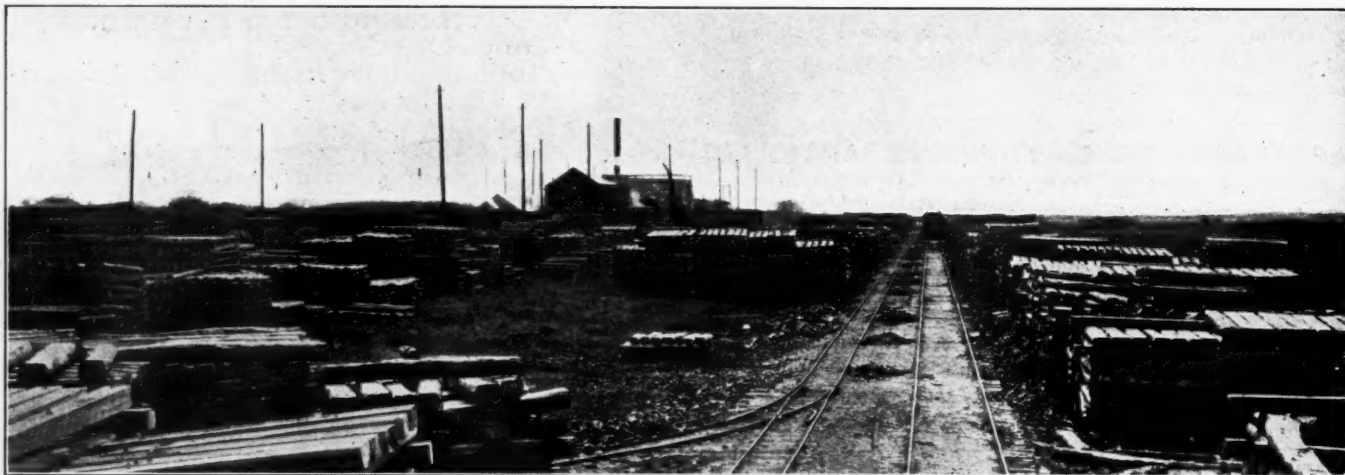
NEW CREOSOTING PLANT NEAR WINNIPEG.

Marks the First Move on the Part of the Canadian Pacific
Railway to Use Treated Timber for Ties on a Large Scale.

The Dominion Tar & Chemical Company, Ltd., has recently built and is now operating a creosoting plant about six miles east of Winnipeg, Man. This is one of the first plants to be built and operated in Canada for treating railway ties. The plant has a contract to treat from 500,000 to 1,000,000 ties for the Canadian Pacific annually for ten years, which marks the first use of treated timber for ties on a large scale by that road. The plant also has a contract to treat some ties for the Canadian Northern, which will be used for experimental purposes, and

to treatment as some other woods, they are used because they are easily obtainable along the company's lines. The climatic conditions in Canada are such that decay in ties is not so rapid as on roads located further south, the period of the year in which the frost is out of the ground, which is the only time that decay can seriously affect the wood, being much shorter.

The plant is equipped to treat timber by any method. The C. P. R. and C. N. R. contracts specify the Bethell process, injecting a minimum of two U. S. gallons per tie. The ties are



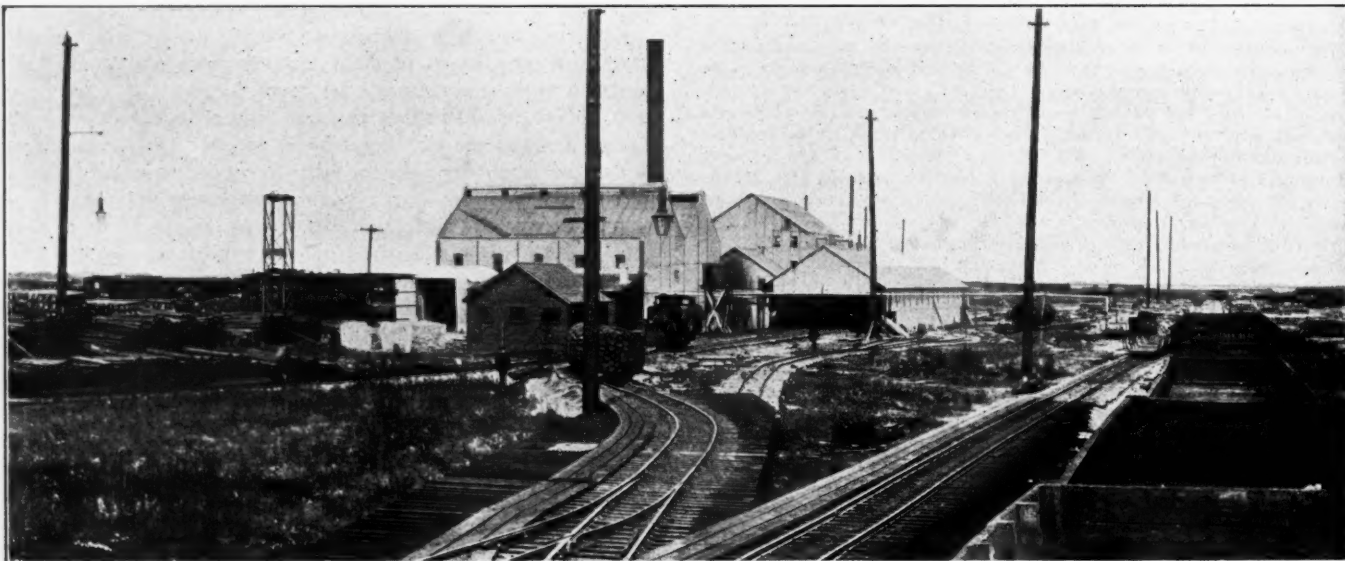
A Portion of the Tie Storage Yard.

large paving block contracts are being executed successfully for various cities in western Canada.

The plant was built on a comparatively small scale, but was designed with a view to future enlargement, and some additions are now being made, while others are definitely planned. The two cylinders now being operated have a capacity of over a million ties annually upon the basis of present operations. The ties treated are principally jack pine, Norway pine, tamarack and white spruce, while some experiments are being made with British Columbia spruce and fir, and black spruce and poplar from Ontario. Although some of these species are not as well adapted

receiving from two to 3½ gallons, depending upon the size of the ties. The process consists of preliminary steaming when the timber is not air seasoned, followed by a vacuum, after which the cylinder is filled with creosote and the desired amount of oil injected into the timber. After the oil is ejected from the cylinder, the timber is allowed to stand a short time to recover the drippings. Most of the oil used is secured from the distilling plants which the Dominion Tar & Chemical Company operates at Sault Ste. Marie, Ont., and Sydney, N. S.

The treating plant occupies a tract of 40 acres, with the buildings located near one end of the yard. It is planned to add 30



General View of Treating Plant from Loading Platform.

acres to this next year, which can readily be done, as the company owns 110 acres. There are four long yard tracks serving the storage piles, which are designed to accommodate 700,000 ties and the additional yard space planned for next year will provide for the stacking of over a million ties.

Practically all of the ties that reach the plant are shipped with the bark on the sides, which must be removed as the ties are unloaded. At present this work is being done by hand, but, when an adzing and boring plant is installed, as is planned for next year, it is hoped that some arrangement can be made to bark the ties by machine when they are adzed, although no detailed plan for effecting this has yet been prepared. All ties are seasoned before treatment, the length of time varying with the species of the wood and the requirements for treated material. Each yard track is paralleled by a narrow gage track for the operation of the cylinder cars. The narrow gage cars are operated by two narrow gage locomotives, one of which is of English make. A five-ton locomotive crane is used for handling some of the treated ties and paving block baskets and for switching standard gage cars when necessary. It has also been found very useful in the building of tanks and other facilities about the plant.

The yard is connected at one end with the main line of the Canadian Pacific and at the other with a branch line of the Canadian Northern. An elevated loading platform of frame trestle construction is provided for loading treated ties in standard gage cars for shipment. This platform is served by two narrow gage tracks.

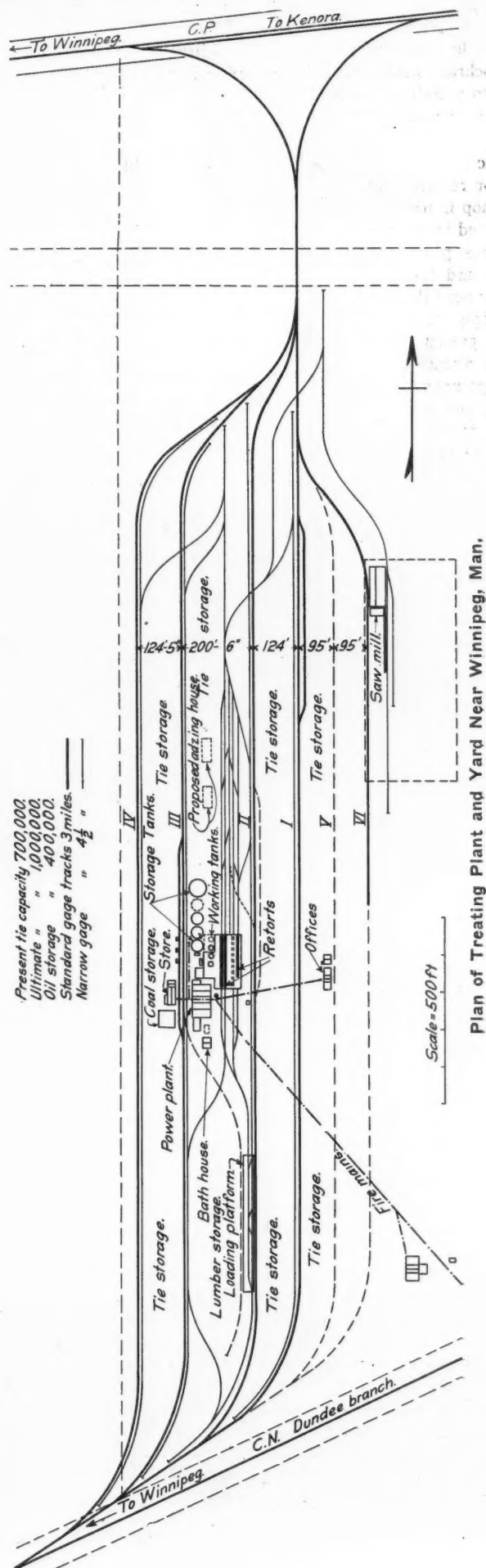
The treating plant is housed in steel frame buildings covered



Loading Treated Ties from Trams to Standard Gage Cars.

with corrugated iron. There are two treating cylinders 6 ft. 6 in. in diameter and 135 ft. long now in use, a third one 6 ft. 6 in. in diameter and 84 ft. long is practically completed, and a fourth one 6 ft. 6 in. in diameter and 135 ft. long has been ordered. The present cylinders have a capacity of 16 trains to a charge. The cylinder doors are swung from a crane attached to the cylinder, and when closed, are secured by 24 clamps. These clamps are of heavier construction than that commonly used in creosoting plants in the United States. The cylinders are supported on I beams carried on concrete foundations, with a special channel and I-beam construction at the expansion joints.

Two working tanks, 20 ft. in diameter and 14 ft. high, with a capacity of 34,500 gallons, supply oil to the cylinders through 8 in. pipes. A third working tank of the same size is practically completed and ready to operate. Compressed air is used to force the oil back when the pressure is removed. Recording thermometers and gages are provided in the engine room, which make a permanent record of the temperature and pressure in each cylinder during treatment, and a similar gage registers the vacuum. Indicator gages are also provided to show the amount of oil in the working tanks. The engine room is equipped with three oil pressure pumps, two vacuum pumps and two air compressors. The piping from the oil pumps is so arranged that either pump can force oil into either cylinder, thus eliminating the necessity for delay when either pump is out of order. Steam



for the plant is supplied by two 450 h. p. Babcock and Wilcox boilers. Boiler water is secured from wells and is treated by a soda and lime softening process. The boiler feed water is heated by a Cochrane heater. A 350-amp. 100-volt generator direct connected to a 50-h. p. engine furnishes electricity for 16 arc lamps and 350 incandescent lights throughout the yard and the buildings.

A machine shop alongside the boiler plant is able to take care of minor repairs, and the locomotive house adjacent to the machine shop is used to store the yard locomotives. A bath house is provided in the yard for the use of the 135 or more workmen which the plant employs. This house is equipped with two showers and four tubs. A boarding house is furnished by the company near the yard for the accommodation of the workmen. The supply of creosote for the plant is kept in three storage tanks at present, one 40 ft. in diameter and 25 ft. high, and two 30 ft. in diameter and 15 ft. high. Two additional 30 ft. tanks 15 ft. high have been ordered and will be erected this year.

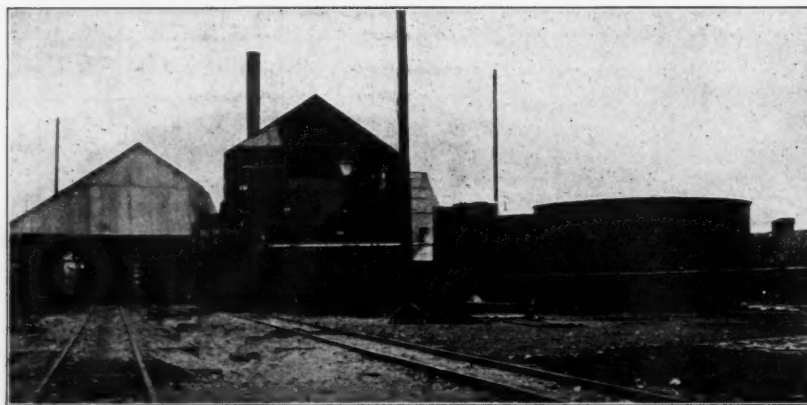
This plant is operated under the direction of F. W. Coates, manager for the Dominion Tar & Chemical Company, and G. G. Roberts, assistant manager. J. H. Dixon is the representative of

A year or more ago I was authorized to pay about 10 cents per day more than the usual rate to a limited number of the most intelligent, sober, laborers with the understanding that they were to stay in the service and fit themselves for promotion. At intervals these laborers were required to make the usual daily, weekly and monthly reports with the assistance of the foreman, and later, to act as relief or extra foreman for short periods. When a permanent position was to be filled the laborer who had shown up best on trial would get the promotion, and in several cases gave as good or better satisfaction from the start, as the older foreman he replaced. I believe if this method was generally followed the problem of how to provide reliable track foremen for the future would be solved.

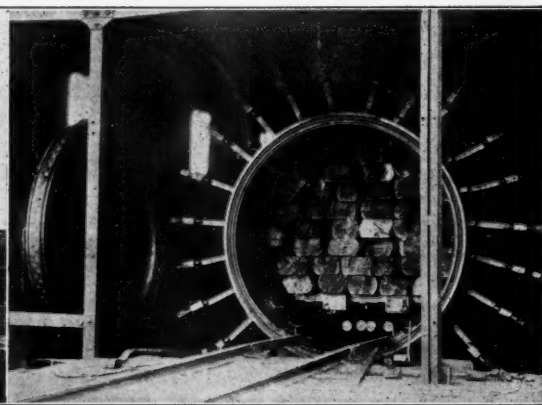
TYPES OF DEFECTIVE RAILS AND SOME METHODS USED IN DETECTING THEM.*

By ROBERT JOB.

Under present conditions of railroad traffic in this country it is of especial importance to secure strong, sound and durable



Cylinder House, Working and Storage Tanks.



End of Cylinder with Door Open.

the Canadian Pacific at the plant. We are indebted to all of these gentlemen for the above information.

THE FOREMAN PROBLEM.*

By M. HENRY,

Supervisor, Chicago & Eastern Illinois, Salem, Ill.

The decline in the quality of track foremen is due to the development of the country and the failure of the officers of most railways to note the declining quality of track laborers and to take steps to improve conditions. A few years ago, in outlying districts especially, the track foremen very often had the best position in the community and could draw on the very best class of laborers for track work, many of them above the average in intelligence and with good common school education. As the country developed this class drifted into other lines where wages were better and working conditions more satisfactory, leaving the track foreman to get along as best he could with old men and boys or, as a last resort, the foreigners.

The high cost of living and the demand for labor makes it necessary, in order to provide experienced trackmen, to increase the wages of track foremen and laborers enough to induce the better class of common laborers to take up track work. To supply reliable track foremen from the ranks, it is necessary to resort to a systematic course of training for the better class of laborers. My experience has been that foremen with apparently first class references applying for positions have been a failure. Very few reliable foremen ever get out of employment.

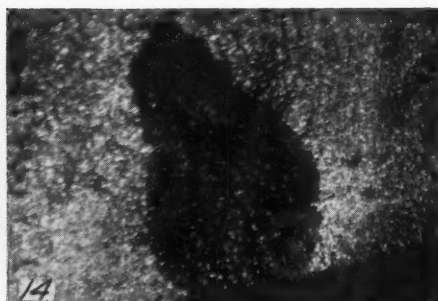
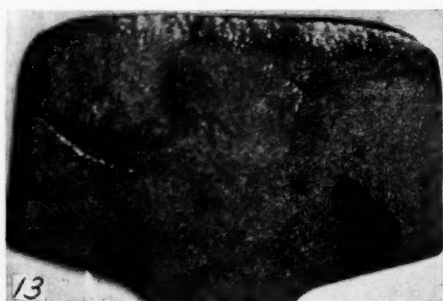
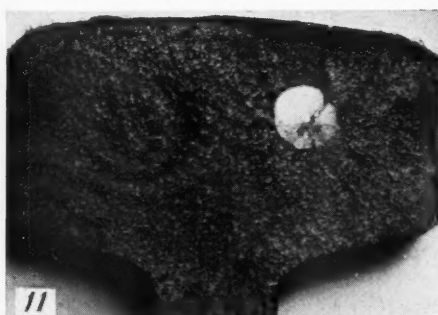
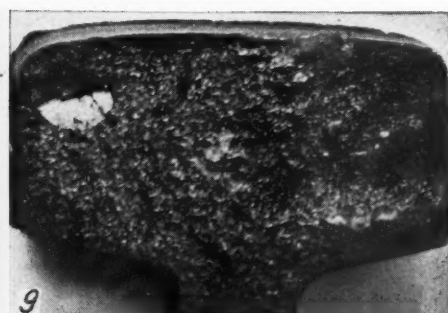
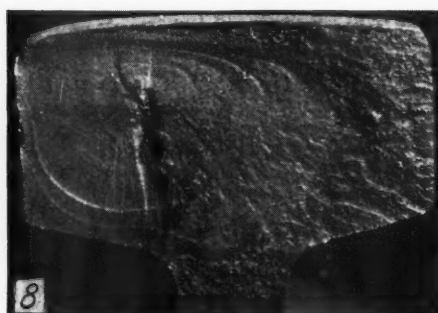
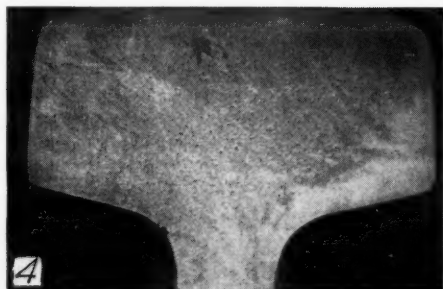
*Received in the contest on The Section Foreman Problem, which closed March 25, 1912.

rails. The compositions best adapted to the varying requirements have been pretty well determined by the teachings of service. The open-hearth process which permits the use of greater toughness and hardness through low phosphorus and sulphur content, has been widely extended, and the various principles and details of manufacture have been so thoroughly studied that our mills are capable not merely of rolling a large tonnage, but also of securing a high excellence in quality.

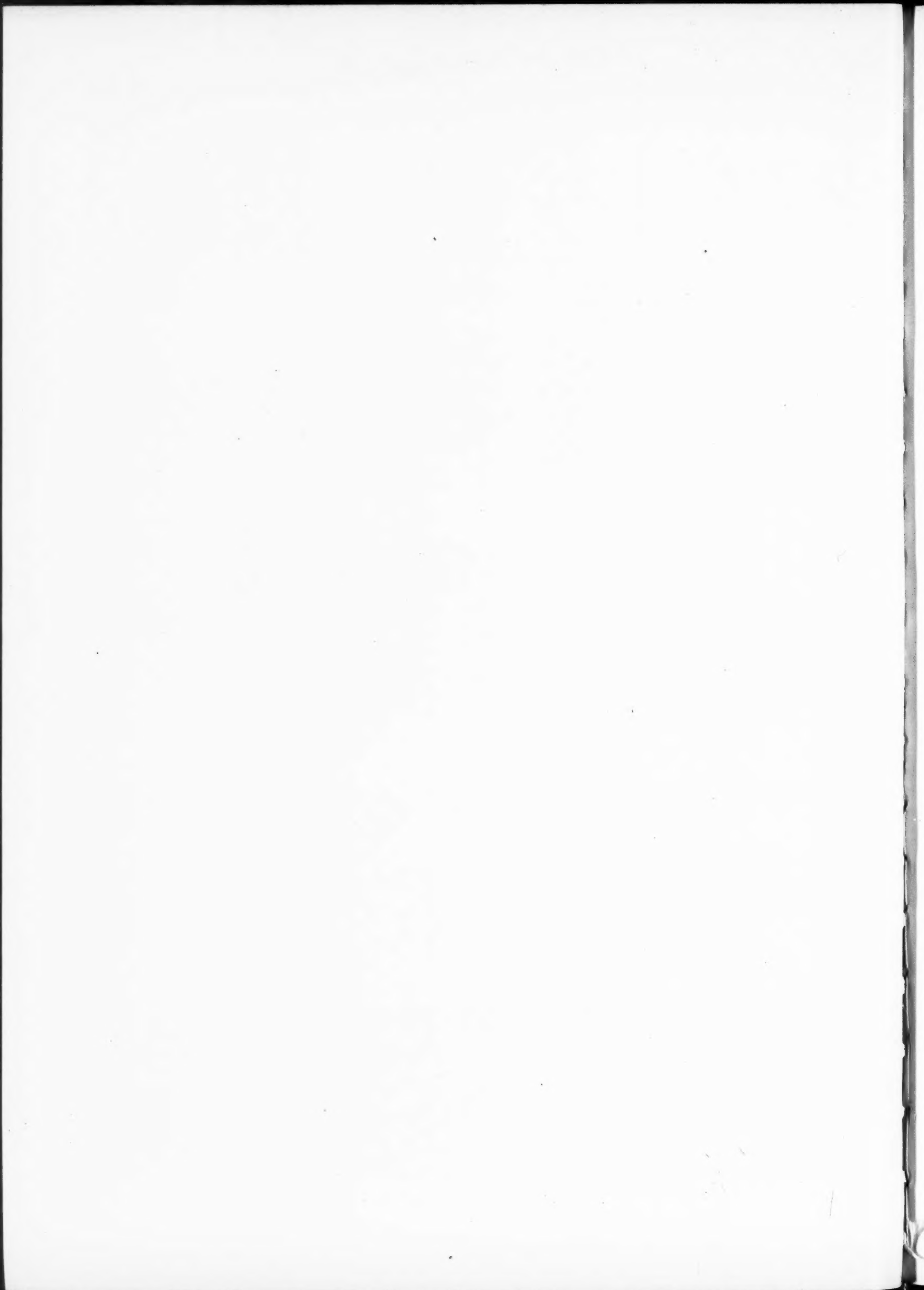
It is a well-known fact, however, that decided variations in the product at times occur. Sometimes the large majority of the rails from a given rolling give good service while only a small percentage are found to contain defects which cause failure in the track. In other rollings from the same mills the percentage of defective rails is much higher, although the rails may be used under nearly identical conditions as to track and service. In many instances good rails immediately beside one which failed have been removed from the track and carefully studied with the object not merely of finding out the exact cause of the failure, but also of ascertaining the qualities which resulted in good service under the same traffic conditions. It may be of interest to show types of various failures which in a measure are characteristic, and which have come to our attention under widely differing service conditions in various parts of this country and of Canada, and also to give a brief account of some methods which have been devised with the object of detecting defects which would detract either from safety or from serviceability.

One of the best known popularly of these defective types is the so-called piped rail shown in Fig. 1, which is caused by de-

*Presented at the Sixth Congress of the International Association for Testing Materials, New York, September, 1912.



Different Types of Defects Found in Steel Rails.



fective mill practice in failing to crop the blooms to sound steel. A rail of this kind does not generally fracture in the track, but mashes down gradually and is detected by the track men and removed before it becomes unsafe.

Another type shown in Fig. 2 is the split head. In the illustration the flowing over upon both sides of the head is shown. This section has been polished and lightly etched with iodine, and it will be seen that the metal is thoroughly unsound, again due to failure at the mill to crop the blooms to sound metal. As a result, the steel has too little tenacity to support an ordinary load, and crushes.

In Fig. 3 we look down upon the top of a 100 lb. rail from which a layer about three-eighths inch thick has broken out in service. A seam runs lengthwise through the rail, and by carefully observing the fracture it will be noted that the failure began at the seam line and extended gradually in service until the crack reached one side of the head and nearly extended to the other. A failure of this kind is particularly dangerous since it is gradually developing while the rail is in service and no outward indication may be given of the presence of the defect. The rail in question was made by the open-hearth process and had the following composition:

Manganese	0.82	per cent.
Sulphur	0.030	per cent.
Phosphorus	0.025	per cent.
Carbon	0.77	per cent.

This composition was normal and gave no indication as to the cause of failure. Fig. 4 shows an etched section from the same rail taken at the same location. It is seen that the steel is thoroughly unsound and porous and shows clearly the spot at the seam line. The exact method of formation of this type is beyond the scope of our present subject, but it is an evident defect in mill practice. Fig. 5 represents another longitudinal crack of the same type. In each of these cases the composition was normal, but the same condition of extreme unsoundness, resulting from defective mill practice, was present. Fig. 7 gives another example of a radically unsound rail with a split lengthwise in two planes, and Fig. 6 shows the upper portion of the head with the slag-line at which the fracture began. This condition obviously would have been avoided by proper mill practice.

Fig. 8 shows the type of failure known as an "internal transverse crack." This is also particularly dangerous since it is not present in the rail when rolled, but begins to develop in service at some point of weakness within the steel, and gradually extends across the head until fracture of the rail occurs. The rail in this case was made by the Bessemer process and had the following composition:

Carbon	0.67	per cent.
Phosphorus	0.58	per cent.
Manganese	0.88	per cent.
Sulphur	0.041	per cent.

This rail was removed from track and broken under the drop, and a similar crack, though smaller, was found in the lower part of the head near the web, about three feet from the first, while about a foot further along the rail a small crack was found in the process of development as shown in Fig. 9.

A characteristic form is shown in Fig. 10 and the nucleus of weakness at which the fracture began is clearly seen near the center of the crack. Fig. 11 illustrates again the gradual growth of what later on would have been a failure of this nature and the spot of weakness at the center is evident.

Owing to the dangerous character of this type of failure and the need of definite knowledge as to the prime cause of the growth, we made a critical study of the subject, gathering data throughout the country. This defect has been found in low carbon steel and in high carbon steel—in rails as heavy as 100 lbs. per yard, and as light as 80 lbs., while in some cases, where rails as light as 67 lbs. were used and subjected to the same wheel pressures, none of the defects had developed.

This defect has been found in relatively small numbers in both Bessemer and in open-hearth steel, made at different mills

and in service in various parts of this continent. Thorough study proved beyond question that the composition of the steel in its ordinary elements was not the cause of the failure, and also that the conditions of service were not the prime cause. Analysis of the small central core in these spots was not conclusive, and microscopic investigation proved that the spots were mere cracks and did not extend longitudinally along the rail. In other words, they had no depth, but on examination of the steel in the immediate vicinity of the central core we always found decided porosity or other source of weakness, this condition being caused by various defects in the mill practice. In one of these unsound rails shown in Fig. 12 two internal transverse cracks had developed within about one inch of each other.

Another characteristic form of internal transverse crack is shown in Fig. 13, that of a badly segregated open hearth rail in which the manganese content was 1.62 per cent., although the heat average approximated .80 per cent. Fig. 14 shows a three-fold enlargement of this spot. By noting the formation of the ridges it is apparent that the fracture began inside the head and gradually extended until it reached the surface. The spot was about three-quarters of an inch long. Fig. 15 represents a similar crack in a 110 lb. open-hearth rail in which the manganese was also excessive, 2.65 per cent. being present, whereas the heat average was approximately .90 per cent. In both of the latter cases the abnormal composition was caused by failure in manufacture properly to mix the manganese added in the ladle.

Our experience has been that a defective condition is very seldom characteristic of an entire rolling, but that it is generally present only in individual ingots. Consequently it is clear that in order to guard most effectively against the various defects and at the same time utilize the largest possible proportion of the rolling, it is desirable to test each ingot in the rolling, stamping each rail with its ingot number, in addition to the heat number and the letter indicating its position in the ingot. Also, in order to forestall as far as possible the various defects in the rails, we found it advantageous to place a considerable number of inspectors throughout the mills to watch the progress of the manufacture in its various details and to report all variations which would tend to lessen the value of the product. The plan has now been in operation for about one year with very satisfactory results.

These extraordinary, though now needful, precautions on the part of a railway company should be unnecessary since they are intimately connected with the manufacture of the steel and should properly be observed by the mill itself to safeguard the quality of its own product.

Of the routine tests we have found it advisable to make a drop test upon a butt from each ingot in the heat in order to avoid brittleness, rejecting all rails from each ingot which fail under the test. The ductility test of Dr. P. H. Dudley has also been found extremely useful in helping to avoid qualities which result in some of the types of failures shown above. The test to destruction under the drop to detect piping is also of great value, as it serves as a check upon the work of the men at the shears and tends to reduce to a minimum the number of piped rails in any given shipment, particularly when the tests are made upon the ingot plan mentioned above. The deflection measurement under the drop test enables one to avoid undue softness, while base seams may be detected if present by making the drop test with the head of the rail downward, as is our regular practice, but with the base slightly inclined so that the drop will strike the extreme side of the base and thus open up as a result of the blow any unwelded seams which may be present. If seams are found the top rail of the ingot might properly be rejected. This modification does not interfere with the effectiveness of the drop test in other respects. I wish to emphasize with all the force of which I am capable, the absolute unfairness of forcing upon the railroads the detecting of defects which if the rails were properly made would seldom be present in the steel.

TRACK SCALES.*

By H. T. PORTER,

Chief Engineer, Bessemer & Lake Erie.

In looking over competitive bids for track scales from time to time, the writer never was able to find that there was sufficient information in the plans and proposals of the scale companies to enable one to make a comparison of the relative merits and capacities of the scales. The writer submits herewith a proposed set of specifications for a 46-ft., 150-ton, four-section track scale. These specifications are not submitted as a finished product, but as a first effort. This is a subject on which there is very little information readily available, and the writer thinks that a move should be made to standardize track scales. We once asked for bids on track scales without any attempt to give particular specifications, and were advised by one of the scale companies that by reason of the variations in details and methods of figuring, they could furnish 49 different kinds of scales under those requirements. This is merely mentioned to show the necessity of standardizing, as a great many of the variations in the construction have no special merit, but became necessary to satisfy the whims of the draftsman in the office of the purchaser.

The following are the general specifications for 150-ton 46-ft. track scales on the Bessemer & Lake Erie:

Plans.—Each bidder shall submit a strain and stress diagram of the scale he intends to furnish, showing thereon the proposed sections of the various parts under strain, and all plans showing details similar to those intended to be used in the construction of this special scale; these plans to be submitted at the time of making his bid.

Length.—The length of this scale shall be known as 46 ft.; this length to be the distance between the ends of the live rail. The ends of the live rail should be vertically above points located not less than one-fifth of the distance between the first and second sections distant from the center of the end section of the scale.

Number of Sections.—There shall be four sections.

Rating.—The rating of this scale shall be known as 150-ton 46-ft. track scale, and this load shall be used in the design, each section to be considered as taking one-fourth of the rated tonnage, or 37.5 tons live load.

Dead Load.—The dead load of any part may be neglected when the strain produced by it is less than $2\frac{1}{2}$ per cent. of the strain produced by the rated load.

Impact.—An impact equal to 100 per cent. of the rated load shall be everywhere added, in designing.

Grade.—The maximum grade to which the scale rails will ever be laid is 0.3 per cent., and such grade shall be obtainable by tapered shims to be placed between the bottom of platform stringers and supports, these shims to be omitted should the purchaser desire to have the scale rails level.

Load Adjustments.—Means should be provided by wedge blocks or other device for taking up any minor irregularities of the platform supports, on account of variations in manufacture or setting.

Deck.—The scale deck shall be of the rigid type, supported by the pit walls, and shall overhang the ends of the platform stringers to correspond with the design of the platform length, relatively to the lengths between sections.

Stringers.—The stringers shall be I-beams of Carnegie structural steel, Manufacturer's Specifications for Steel for Railway Bridges. The span shall be considered as the c. to c. distance between any two sections, and the maximum bending stress calculated shall not exceed 16,000 lbs. per sq. in., assuming no continuous action over supports. The minimum depth of I-beams shall be 24 in. The stringers shall be thoroughly braced laterally by angles not less than 3 in. in width, and by transverse

diaphragms. Connections to have $\frac{3}{4}$ -in. rivets or larger. No structural parts shall be less than $\frac{3}{8}$ -in. thick.

Special Clause, Structural Steel.—The manufacturer will submit a general plan of structural steel showing sizes and total estimated weight, at the time of making his bid, and all necessary scale dimensions in the final plan, after contract is signed, which will enable a structural manufacturer to fabricate the steel to fit the scale details.

Suspension Bearings.—The load of the platform shall be transmitted to the main levers by means of suspension bearings. No forged links shall vary more than $\frac{1}{16}$ -in. from the dimensions shown on the plans.

Levers.—The main levers shall be of cast steel. Other levers may be of cast iron or of cast steel. Level tabs shall be cast on the tops of levers about 12 in. c. to c. and faced accurately. The unit stresses in levers shall not exceed the following values: Cast-iron, 3,000 lbs. maximum tensile stress; cast-iron, 18,000 lbs. maximum compressive stress; cast-steel, 8,000 lbs. maximum tensile stress.

Knife Edges.—The knife edges shall be separate from the bearing in main and extension levers and of silico-manganese steel; the load per linear inch of the knife edge shall not exceed 5,000 lbs. The line of knife edges in any one lever should coincide as nearly as practicable with the neutral axis of the lever.

Bearing Blocks.—Cast-steel bearing blocks, self-centering the bearing on supports, shall support the knife edges.

Supports.—The scale levers shall be supported by cast-steel standards resting on concrete pedestals, and no parts subject to tensile strain shall have a unit stress exceeding 8,000 lbs. The bearing on the concrete shall not exceed 300 lbs. per sq. in.

Check Rods.—Check rods shall be provided transversely and longitudinally.

Multiple.—The multiple of the beam pull shall be 800, but an additional rod whose pull is 400 shall be provided for attaching to the 2 to 1 lever of a Streeter-Amet recorder.

Beam.—The main beam shall be graduated in thousands of pounds, up to 200,000 lbs. An auxiliary sliding poise attached to the main latched roller poise shall move over graduations of 50 lbs. for 1,000 lbs. All weights in excess of 200,000 lbs. to be hung from the end of the beam.

The graduated scales shall be of brass.

Painting.—All parts, except wearing points and brass, shall be painted before shipment.

Foundation Plan.—The scale manufacturer shall furnish a foundation plan showing all necessary dimensions to install the scale. The pit shall be amply wide to permit thorough inspection and make all parts accessible.

Purchaser Furnishes.—The purchaser will construct the foundation to the dimensions shown by the manufacturer's plan and will place all bolts and structural steel that is to be built into the masonry. The purchaser will also furnish and construct the deck, weather guards around rail chairs, scale house, and provide foundation bolts, 100 lbs. scale rails and fastenings. Purchaser will furnish structural steel to fit dimensions shown on scale plans.

Easer Rails.—Easer rails will be provided for both ends of the scale by the purchaser, but the scale manufacturer shall not consider the length of the platform as affected thereby.

Superintendence.—The manufacturer will be notified when the foundation is completed, and he shall furnish a competent erecting foreman to superintend the installation of the scales; any assistance this foreman may need will be supplied by the purchaser. Erecting foreman will be paid for at a rate per day as specified in the bid.

Inspection of Material, etc.—All material or workmanship shall be subject to the inspection of the purchaser's representatives.

Guarantee.—All parts failing as a result of defective material or workmanship of any parts furnished by the manufacturer shall be replaced free of extra cost to the purchaser.

*From bulletin No. 148 of the American Railway Engineering Association.

PROTECTION OF EMBANKMENT FROM WAVE WASH.*

By F. M. PATTERSON,

Assistant Engineer, Chicago, Burlington & Quincy, Chicago.

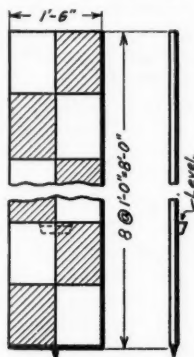
In many parts of the Mississippi valley embankments are often subject to damage from waves during high water, and this action is particularly severe when the water is about at the level of the shoulder of the bank. It is usually not economical to protect banks with riprap where they are not exposed to the current or liable to be overtopped by high water. For such places a cheap and efficient protection is afforded by the use of brush or bushy saplings, willows being usually the most available and being peculiarly suitable for the purpose. The larger end is secured to the embankment either by a stake, or better by a rope, at the water's edge, the brushy part floating on the water at the side of the embankment. A fringe of this brush 2 or 3 ft. wide will almost completely prevent the cutting action of the waves.

SIGHT BOARD FOR SETTING CENTER STAKES.*

By J. L. TAYLOR,

Assistant Engineer, Grand Rapids & Indiana, Fort Wayne, Ind.

After the track has been raised on ballast it should be accurately lined to center stakes set with a transit. In setting these stakes in hot weather there is usually so much "heat" rising



Taylor Sight Board.

from the track that an ordinary sight rod cannot be seen further than 2,000 ft. By using a board, similar to the attached sketch for a foresight, even in the hottest weather, the top 2 or 3 ft. can always be seen. The level bubble attached insures the board being held in a true vertical position, so that even the top of the board will always form an accurate foresight. The board is mounted on a steel pointed shoe at the bottom.

JIM CROW LEVER BENDER VS. ROLLER BENDER, FOR CURVING RAILS.*

By P. H. HAMILTON,

St. Louis & San Francisco, Pittsburg, Kan.

It is the practice in most places to use a roller bender for curving rails when relaying curves. While a gang was curving rails for a 15-deg. curve recently the roller bender was broken and the foreman had to resort to the Jim Crow bender to finish the job. He found that by setting the plunger so that it barely touched the web of the rail he could pull the lever down and put a slight bend in the rail. Then, lifting the lever he would slide the bender forward about 14 in. and push the lever down, repeating the performance, from one end of the rail to the other. One adjustment of the plunger was all that was necessary. To the foreman's surprise he found that he could curve a rail with the Jim Crow bender in one-third the time that it took with a roller bender, and it did not take as many men to do the work.

*Entered in the Track Kink contest, which closed December 25, 1911.

General News.

The United States Civil Service Commission announces examinations November 25 for mechanical draftsmen. Candidates are wanted for temporary service at \$5 to \$6 a day at Ellis Island, New York harbor.

The Vandalia Railroad has established a department of safety, with general and division committees like those on many other prominent roads. J. W. Coneys, superintendent of the Pennsylvania, at Indianapolis, is chairman.

Professor Edward C. Schmidt announces a gift to the University of Illinois from the Midvale Steel Company of Philadelphia, of four axles and four pairs of supporting wheels for the new locomotive laboratory which is now under construction.

The northbound Shasta Limited of the Southern Pacific was stopped by robbers at Delta, Cal., on the night of November 8, and the registered mail was rifled. The trainmen fought the robbers, and a brakeman killed one of them.

The Glenfield & Western Railroad has been authorized by the New York State Public Service Commission to suspend operations from December 15 to May 1. This road, about 20 miles long does little business except in connection with lumber operations. It connects with the Ontario & St. Lawrence division of the New York Central at Glenfield, N. Y.

The mail car of southbound passenger train No. 7 on the Louisville & Nashville was robbed on the morning of November 8, a few miles north of Birmingham, Ala. The robbers rode in the mail car 26 miles, and then succeeded in binding the mail clerks and escaping before their presence on the train was known by the trainmen.

Captain A. C. Baker, U. S. N., who was connected with the Chicago Exposition in 1893, the Paris Exposition in 1900 and the St. Louis Exposition in 1904, has been appointed director of exhibits of the Panama Pacific International Exposition, to be held at San Francisco in 1915. Captain Baker is especially well-informed in the transportation field.

Miss Annie Criley has retired from the position of station agent of the Pennsylvania, at Glen Loch, Pa., after 45 years' continuous service for that company. She began as a telegraph operator in 1868. Miss Criley will receive a pension and will be allowed to continue to make her home in the company's house which she has occupied for many years.

An informal meeting of the Iron and Steel division of the American Institute of Mining Engineers was held in New York, on November 7, at which Benjamin Talbot of The Cargo Fleet Iron Works, Middleborough, Eng., described a new method of getting rid of piping and segregation in steel ingots by compressing the ingots after the outer portion has cooled and while the interior is still liquid.

The Licking River Railroad in eastern Kentucky is to be torn up because it does not pay to operate it. This information is taken from Kentucky newspapers, which say that the people of the Licking river valley need the road and will miss it. This road is 32 miles long, 3 ft. gage, and connects the Chesapeake & Ohio at Salt Lick with the lumber works of the Yale Lumber Company. It was built as a lumber road and has had little traffic besides lumber. According to its last report it had four locomotives, three passenger cars and 71 freight cars.

Disastrous Collisions in Louisiana and Georgia.

In a rear collision on the Yazoo & Mississippi Valley, at Montz, La., on the morning of November 11, about 12:30 o'clock, 13 passengers were killed and 30 or more were injured. Nine of the killed and about half of the injured were negroes. Of the injured some were said to have been subsequently burned to death, the cars having taken fire immediately after the crash. A north-bound passenger train carrying a large number of excursionists, while stopped on a curve, was run into at the rear by a following fast freight train. It is said that the collision was due to the neglect of the rear trainman of the passenger, who went back only about 1,100 ft. The freight engine ran through the whole length of the rear passenger car, and this car and the two next to it took fire and were burnt up. The

fourth and fifth cars from the rear also were badly damaged. There was a dense fog. The passenger train had been standing 35 minutes.

In a butting collision between a freight train and a work train on the Louisville & Nashville at Emerson, Ga., on the 8th of November, seven employees were killed and 15 were injured, most of the victims being laborers on the work train. The foreman and the assistant foreman on the work train were killed, and two enginemen and two brakemen were among the injured.

Disastrous Collision in Indiana.

In a butting collision between a westbound passenger train and an eastbound freight on the Cincinnati, Hamilton & Dayton at Irvington, Ind., five miles east of Indianapolis, on the morning of the 13th at 3 o'clock, 15 persons were killed and 17 injured. The wrecked passenger cars took fire, but, according to the reports, the flames were extinguished before any persons were burned. The accounts indicate that the collision was occasioned by a misplaced switch, the responsibility for which is placed on the men in charge of the freight train.

Telegraph and Telephone Pensions.

Theodore N. Vail, president of the American Telephone & Telegraph Company, and of numerous subsidiary corporations, and also of the Western Union Telegraph Company, announces that on January 1 these allied companies will put in operation an elaborate pension and benefit scheme for their employees; and it is said that it is the most liberal and comprehensive scheme of the kind ever adopted. The total number of employees in all the companies is about 175,000. The plan contemplates the accumulation of a fund of \$10,000,000 which is to provide for the employees of the companies named and also for those of the Western Electric Company. The total yearly pay rolls of these companies aggregate \$115,000,000. The compulsory retirement age for male employees is 60 years (ten years younger than on most railroads); optional age 55 years; the pension age of females is five years younger in each case. As on railroads, the pension rates are to be based on the years of service and the amount of pay, and will be 1 per cent. of the average annual pay for ten years, multiplied by the years of service. No pension will be less than \$20 a month.

For accidents while at work the employee receives for total disability full pay for thirteen weeks and half pay until he returns to work, up to six years. Partial disability is compensated on the same terms, except that half pay is given until the employee can earn a livelihood, not exceeding six years.

Full pay for thirteen weeks is provided for sick employees who have been ten years in the service, together with half pay for 39 weeks. Five to ten years' service brings the same full pay time, with thirteen weeks of half pay. Two to five years' service brings four weeks' full pay and nine weeks' half pay. Heads of departments may pay benefits to employees under two years' service.

In case of death caused by accident in performance of work the employee gets insurance equal to three years' pay, the maximum payment being \$5,000. Death from other causes will be met with one year's pay for employees ten years in service and six months' pay for five to ten years' service, the maximum being \$2,000. State laws providing for more liberal compensation will prevail. Employees may have option as to legal rights in accident cases, as against the benefit plan.

Trainmen Want More Pay.

A recent convention of general committees of conductors and brakemen held at Rochester, N. Y., and representing the brotherhoods of these two classes in the eastern states, drew up a schedule of rates of wages on which, it is said, will be based a communication to the fifty-two eastern roads asking for an increase of pay. The conductors and brakemen had their pay advanced about 10 per cent. in 1910. In the scheme which has now been drafted they propose to ask for rates of pay graded according to the length of trains; also according to the grades of the road, where these are very steep (over two per cent.). It is also proposed to ask for overtime at a higher rate after the first hour with another increase after the second hour. On passenger runs monthly guarantees are to be demanded, as follows: Conductors, \$135 a month; baggage masters, \$87; rear brakeman, \$84, and other brakemen, \$81.

Some of the demands for through or irregular freight trains are as follows: For trains of 60 cars or less, conductors, \$4.20 a day; flagmen, \$2.90, and brakemen, \$2.80. For each additional 10 cars in the train, 3 per cent. of the foregoing rates are added until the maximum trainload of from 150 to 160 cars calls for a rate for conductors of \$6.82 a day; flagmen, \$4.63, and brakemen, \$4.53. These rates are to be increased 12 per cent. upon all runs upon which the controlling grade exceeds 2 per cent. The demands will also stipulate pay at the rate of time and one-half for crews handling double-head trains. If more than two engines are used, or if either one or both of the engines used in double-head trains are of the Mallet type, double time.

Why Cars Are Scarce.

J. F. Holden, vice-president of the Kansas City Southern, has issued a bulletin to the employees regarding the car shortage situation. He ascribes the situation to the fact that the railways have been so restricted as to be unable to finance the purchase of the needed amount of new equipment during the past three years. "While every other business, including agriculture, has been prospering and expanding," he says, "the railways have been prevented from doing their part in keeping up with the growth and expansion of the country, for the reason that the investing public has not been willing to put its money into an industry which has been hampered in so many ways and to such an extent as the railroads have been."

Stoppage of Work on the Southern New England.

On Saturday last the contractors at work on the construction of the Southern New England Railway from Palmer, Mass., southeastward to Providence, R. I., were notified to discontinue their work, and about 2,300 men were thrown out of employment. According to Providence newspapers about \$1,500,000 has been spent on this road already and large sums are yet to be paid. A good deal of work has been done on cuts, embankments and bridges, and it was given out a few weeks ago that the officers of the road expected to have it finished so as to go into operation next summer.

E. J. Chamberlain, president of the Grand Trunk, which controls the Southern New England, and which has been promising the people of Providence that they should have a competing railway to the west, when asked the reason for the suspension of operations on the Southern New England replied that it was because of the stringency of the European money market, following the disturbances caused by the war in Turkey. It is reported, however, in Boston and Providence that the reason back of this is that some agreement has been reached with the New York, New Haven & Hartford, which opposed the building of the Southern New England, and which would probably suffer by its completion. Officers of the New Haven road say that negotiations have been going on with the Grand Trunk looking to a traffic agreement under which the G. T. would be able to solicit freight at all stations on the New Haven and the Boston & Maine lines, on terms satisfactory to itself; but they declare that these negotiations have not yet been brought to a satisfactory termination.

The Boston & Maine has withdrawn an application, which was pending before the authorities of the state of New Hampshire, for permission to build a road between Windsor, Vt., and White River Junction, on the east side of the Connecticut river, an agreement having been reached with the Central Vermont (Grand Trunk) under which the Boston & Maine will be satisfied to continue the present arrangement by which trains are run over the C. V. between those points. This agreement between the New Haven and the Grand Trunk interests is taken as a confirmation of the belief that what has been done in Southern New England is the result of an understanding between the two companies.

On Tuesday of this week representatives of the Grand Trunk repeated their statement, made in the beginning, that the stoppage of work was temporary. President Chamberlain was quoted as denying that negotiations between the New Haven and the Grand Trunk promised a settlement of the controversy upon the basis of the admission of the Grand Trunk into Boston & Maine and New Haven territory on equal terms with other roads in competition for business. . . . So far as he knew, there was no prospect of a compromise with the New Haven. Con-

tinuing, he said, according to the despatches, "We are greatly interested in New England and do not propose to forfeit the good will of the people of New England by any settlement with the New Haven on the basis of the abandonment of our plans for the development of our New England lines. The business men of Boston and Providence and other New England cities need have no concern because we have suspended construction work on the Southern New England. We shall build the railroad into Providence and we shall build the railroad to Boston under the charters we have secured. . . . There is not a bank in Montreal, in London or in New York that at present will lend money on Canada Government bonds. Ordinarily it is comparatively easy to raise money in Montreal, but today every banker tells you that he wishes to wait until the European war atmosphere has cleared."

Car Shortage Less Severe.

The statistics of the committee on the relations between railways show that on November 7 the car shortage total for the country was 71,156, an increase of 3,886 over the total shown in the last fortnightly statement. The surpluses on November 7 aggregated 19,897, an increase over the last preceding statement of 2,608. This makes the net increase in shortage 1,278; but the net increase in Canada is 2,603, so that, taking the United States alone, the net shortage has decreased by 1,325.

Reduction of British Railway Expenses.

Since the ratification of the recent agreements between the British railway companies, there is a general movement (a correspondent writes) toward the reduction of staffs and the closing of unnecessary offices. As the outcome of the agreement between the Great Central, Great Eastern, and Great Northern companies, the staff of the last named will be removed from Cambridge and their duties will be taken over by the Great Eastern men. The Great Central is withdrawing its station staffs at Leeds, Bradford, Halifax, and Keighley, all of which will now be taken over by the Great Northern. At Sheffield and other districts the Great Northern employees are being removed to make way for the Great Central staff. The agreement between the Great Western and London & South-Western companies will be responsible for a number of changes at Salisbury. The Great Western station there will be taken over by the London & South-Western and will be converted into a freight depot in place of Milford. The London & North-Western and Midland's working agreement is also gradually resulting in the cutting down of duplicate staffs, and the freight-receiving offices throughout London and the large towns are being reduced in number. All these changes are causing uneasiness among the staffs of the companies concerned.—*Manchester Guardian*.

Unfilled Tonnage of the Steel Corporation.

The report of the United States Steel Corporation shows that the unfilled tonnage on October 31, was 7,594,381 tons, an increase of 1,042,874 tons over the previous month. A large increase was expected, but the actual figures exceeded all expectations by a large margin. The increase of 1,042,874 tons was never before equaled in a single month, the largest previous increase amounting to 942,806 tons in December, 1911. With the exception of December, 1911, and October, 1912, increases have ranged between 100,000 and 400,000 tons a month. The volume of orders for new business during October was about 2,150,000 tons, or at the rate of about 80,000 tons a day. The unfilled tonnage on the books on October 31, 1912, was the largest since June 30, 1907, when it was 7,603,858 tons.

National Society for the Promotion of Industrial Education.

The sixth annual convention of the National Society for the Promotion of Industrial Education will be held at the Hotel Walton, Philadelphia, December 5-7. The papers and discussions will cover such subjects as Present Tendencies in Vocational Education; Some Debatable Issues in Extending Vocational Education in Pennsylvania; How Can We Train Educated Teachers; Federal Aid for Vocational Education; Opening the Way for Vocational Education; Vocational Education as a Weapon for Child Welfare, and How Can We Get Team

Play Between the Schoolmaster and the Layman? C. A. Prosser is secretary.

M. M. and M. C. B. Conventions.

At a joint meeting of the executive committee of the Master Car Builders' Association, American Railway Master Mechanics' Association and the Railway Supply Manufacturers' Association, held at the Hotel Belmont, New York, on Thursday, November 14, it was decided to hold the June convention at Atlantic City, N. J. A strong effort was made to have the conventions meet at Washington, D. C. The sessions of the Master Mechanics' Association will be held on June 11, 12 and 13, and those of the Master Car Builders' Association on June 16, 17 and 18, 1913. A strong effort was made to have the conventions at Washington, D. C., those favoring Atlantic City winning by the narrow margin of 12 to 10.

American Railway Guild.

The annual dinner of the American Railway Guild will be held in Chicago on Tuesday evening, November 19. David R. Forgan, president of the National City Bank of Chicago, will give an address on "How to Avoid Another Panic." W. F. Allen, secretary of the American Railway Association, will relate the history of the guild and the reasons for its origin.

Railway Surgeons.

The New York and New England Association of Railway Surgeons held its twenty-second annual meeting in New York City, on Wednesday of this week. The president of the association chosen for the ensuing year is Dr. John W. Le Steur, of Batavia, N. Y.

American Society of Civil Engineers.

At the meeting of the American Society of Civil Engineers, held November 6, Kenneth C. Grant, Assoc. M. Am. Soc. C. E., presented for discussion a paper entitled The Flood of March 22, 1912, at Pittsburgh, Pa. This paper was printed in *Proceedings* for August, 1912.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Convention, May 6-9, St. Louis, Mo.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Annual meeting, June 17-20, Buffalo, N. Y.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Friday of March and September.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
- AMERICAN ELECTRICAL RAILWAY MANUFACTURERS' ASSOC.—George Keegan, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York; semi-annual, November 20, 1912, Chicago.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Convention, October 21-23, 1913, Montreal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Convention, March 18-20, 1913, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Convention, June 11-13, Atlantic City, N. J.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—M. H. Bray, N. Y. N. H. & H., New Haven, Conn.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.; annual, June, 1913.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 13 Park Row, New York; 2d Tuesday of each month, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Convention, 3d week in January, 1913, Chicago.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago. Annual meeting, May 28, Atlantic City, N. J.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—J. R. McSherry, C. & E. I., Chicago.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Semi-annual meeting, June, 1913, Atlantic City, N. J.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago; annual, May 20, 1913, St. Louis, Mo.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Meeting Dec. 10-11, 1912, New Orleans, La.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—H. A. Neally, Joseph Dixon Crucible Co., Jersey City, N. J. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursdays, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after 2d Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, 803 Fulton building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, June 18, Bluff Point, N. Y.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago. Annual meeting, May, 1913, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—L. H. Bryan, Brown Marx building, Birmingham, Ala.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Annual meeting, August 18, Richmond, Va.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—W. G. Wilson, Lehigh Valley, Easton, Pa. Convention, November 19-21, Chicago.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Convention, May 26-29, 1913, Chicago.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago. Convention, June 16-18, Atlantic City, N. J.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Annual meeting, September 9-12, Ottawa, Can.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Tuesday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York; annual, November 19, 1912, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo. Next meeting, August 12-15, Nashville, Tenn.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo. Next meeting, Nov. 17, 1912, Cincinnati, Ohio.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. Meetings, March 17, Chicago; June 10-11, New York; convention, October 14, Nashville, Tenn.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TEL. AND TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Convention, September 8-12, 1913, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meetings with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala. Next meeting, April 17, Atlanta, Ga.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meeting with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—Guy S. McCabe, La Salle Hotel, Chicago; meetings monthly, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swode, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7042 Stewart Ave., Chicago. Annual meeting, June 17, Los Angeles, Cal.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Annual meeting, August, 1913, Chicago.

UTAH SOCIETY OF ENGINEERS.—R. B. Ketchum, University of Utah, Salt Lake City, Utah; 3d Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

Traffic News.

On the Golden State Limited, the Rocky Mountain Limited and the Chicago Limited of the Rock Island Lines dinners (at six o'clock) are now served in the dining cars at the uniform price of \$1.

The number of cars moved over the middle division of the Pennsylvania Railroad in October was 187,182, the largest movement on record. This is about 21,000 cars more than the number moved in October of last year.

The amount of grain waiting at Buffalo to be carried eastward is 5,000,000 bushels, and it is said that lake vessels have 7,000,000 bushels additional on board or in sight, ready to deliver in Buffalo as soon as there is room for it.

President Ripley of the Santa Fe has announced that through passenger trains will be put in service between Galveston, Tex., and California, by the fall of 1913 on completion of the connection between Lubbock and Texico.

At Chicago, on Wednesday of this week, six carloads of oranges from California were seized by United States deputy marshals on charges that the fruit had been artificially colored to conceal inferiority, a violation of the pure food law.

The Chicago Transportation Association will hold its annual election of officers on the evening of December 2. There are two tickets in the field. The regular ticket is headed by R. T. Clarke as candidate for president, and the "members' ticket" by C. H. Schnigla.

The Delaware, Lackawanna & Western has experienced such satisfactory results from its "advisory bureaus" established for the benefit of New York state farmers that two other bureaus of this kind are to be established, one of them probably in the state of New Jersey.

George J. Kindel, of Denver, Colo., a well known spokesman for shippers in rate controversies with the railways, has been elected, on the Democratic ticket, a member of Congress. James Manahan, of Minnesota, who has been prominent in a similar way, has been elected to Congress from that state.

The Southern Railway reports that the exhibits which it has been making at state fairs and other shows in the northern and western states during the past season have been visited by 240,000 persons, and that 70,000 of these people have been personally talked with on the subject of the resources and the beauties of the southeastern states.

Shipments of flour from Minneapolis in the week ending November 9 amounted to 518,388 barrels, the highest weekly total on record. The flour filled 1,885 cars. The week preceding 421,000 barrels were shipped. Since September 1 the railways have moved from the city 4,003,192 barrels, compared with 3,594,338 in the like period one year ago.

The Pennsylvania and the New York Central have both announced that, beginning November 24, the fastest trains between New York and Chicago will be run through in 20 hours each way instead of 18 hours, which is the time according to the present schedules. Under the new time-tables the trains (on both roads) will leave New York at 2:45 p. m. and leave Chicago at 12:40 p. m.

The Interstate Commerce Club of Chicago has arranged to hold a series of about twenty-four lectures on traffic and transportation matters by prominent railway and traffic men during the fall and winter. The lectures will cover such subjects as "Sources and Movement of the Products of Commerce," "Principles Governing Classification," "State Classifications and Committees," "Factors Controlling Freight Charges," "Construction of Tariffs" and "Factors Controlling the Application of Rates." The meetings will be held on the second and fourth Thursday evenings of each month at the Great Northern hotel.

Car Balance and Performance.

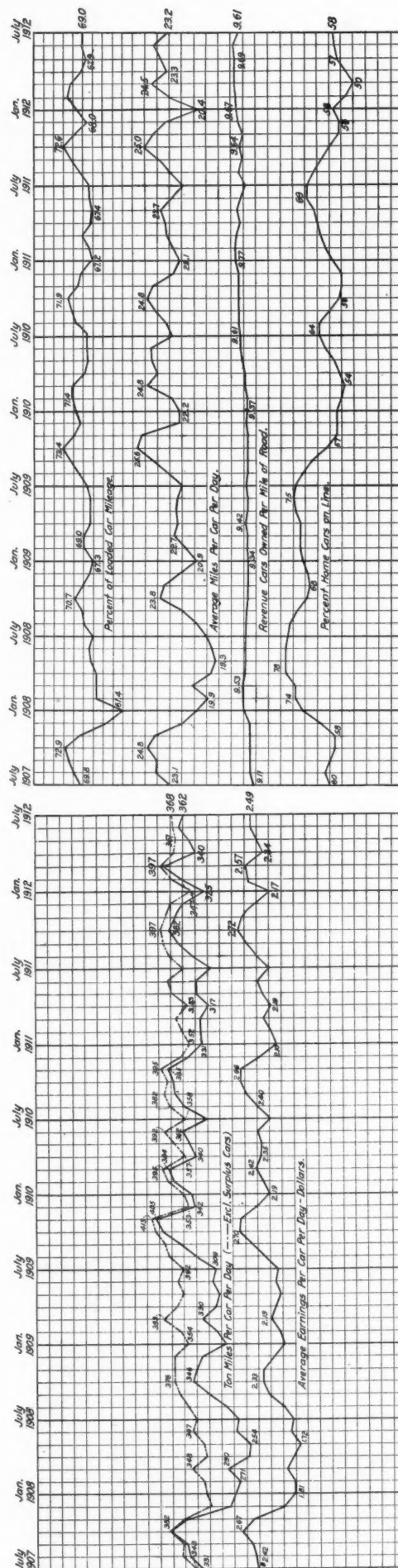
Arthur Hale, chairman of the committee on relations between railways of the American Railway Association in presenting statistical bulletin No. 132, covering Car Balance and Performance for July, 1912, says:

The miles per car per day, including surplus cars, averaged

FREIGHT CAR BALANCE AND PERFORMANCE IN JULY, 1912.

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., Nc. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Minn.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned.....	84,615	686,298	216,323	190,457	174,730	392,139	17,739	141,415	26,268	143,272	117,791	2,191,047
Average number of system cars on line.....	43,000	269,563	130,626	102,136	90,378	262,589	5,378	75,819	19,745	73,484	71,968	1,144,686
Railway-owned cars: Average foreign on line....	45,517	167,503	101,832	62,333	59,318	148,252	10,958	53,479	20,968	56,553	57,811	784,524
Total Railway-owned cars on line.....	97,066	437,066	232,458	164,469	149,696	410,841	16,336	129,298	40,713	130,037	129,779	1,937,759
Excess	3,902	*26,940	16,135	*25,988	*25,034	18,702	*1,403	*12,117	14,445	*13,235	11,988	*39,545
Per cent. of cars on line to total owned:												
Home	51	58	60	53	52	67	30	53	75	51	61	58
Foreign	54	36	47	33	34	38	62	34	80	40	49	40
All railways	105	94	107	86	86	105	92	87	155	91	110	98
Private cars on line.....	4,324	30,964	12,478	3,874	7,410	16,247	1,819	10,422	4,341	11,665	3,446	106,990
Total, all cars on line.....	101,390	468,030	244,936	168,343	157,106	427,088	18,155	139,720	45,054	141,702	133,225	2,044,749
Per cent. of cars in shop.....	7.81	7.03	8.73	8.21	10.50	8.06	7.54	8.76	7.62	5.96	5.90	7.92
No. of freight engines owned.....	1,417	10,342	3,114	3,365	2,842	6,429	534	2,731	739	3,103	1,781	36,397
Average cars on line per freight engine owned...	72	63	79	50	55	66	34	51	62	46	75	61
Total freight-car mileage.....	56,711,434	493,041,195	165,110,641	131,397,248	121,693,765	294,391,072	24,952,255	94,847,407	27,705,128	126,680,422	100,929,414	1,637,459,981
Average mileage per car per day.....	18.0	22.7	21.7	25.2	25.0	21.2	45.6	23.0	19.5	28.8	24.4	23.2
Per cent. loaded mileage.....	72.6	66.7	66.4	67.4	70.8	69.3	74.9	72.0	69.9	71.1	74.4	69.0
Ton-miles of freight, including company freight..	652,936,999	8,113,918,564	2,924,841,783	2,129,398,624	1,699,543,177	3,050,534,814	371,427,494	1,318,303,780	289,295,805	1,832,306,573	1,534,849,032	23,917,356,645
Average ton-miles, including company freight:												
Per car-mile	11.5	17.7	18.1	16.2	14.0	13.9	15.3	13.9	12.6	14.7	15.2	15.6
Per loaded car-mile	15.9	26.4	27.4	24.0	19.7	20.0	20.4	19.5	17.9	20.7	20.4	22.5
Per car per day.....	208	402	394	408	350	295	697	320	246	423	372	362
Gross freight earnings	\$6,955,597	\$48,306,796	\$15,062,193	\$11,947,226	\$11,354,442	\$30,250,956	\$3,032,085	\$11,371,335	\$3,031,105	\$18,661,952	\$10,634,233	\$170,607,920
Average daily earnings: Per car owned.....	\$2.38	\$2.47	\$2.25	\$2.02	\$2.10	\$2.49	\$5.51	\$2.59	\$3.68	\$4.22	\$2.91	\$2.58
Per railroad car on line.....	2.28	2.63	2.09	2.34	2.45	2.38	5.99	2.84	2.38	4.65	2.64	2.63
All cars on line.....	2.19	2.46	1.98	2.29	2.33	2.28	5.39	2.63	2.15	4.27	2.57	2.49

* Denotes deficiency.



Freight Car Mileage and Earnings, 1907-1912.

Freight Car Performance, 1907-1912.

23.2, compared with 24.1 in June, and 21.9 in July, 1911. Ton miles per car per day was 362 in July, compared with 366 in June; this is an increase of 14.2 per cent. over the figure for July, 1911, which was 317. The proportion of home cars on line was 58 per cent., both in June and July, compared with 69 per cent. in July, 1911. There is a slight decrease (.3 per cent.) in the percentage of loaded car mileage, compared with June, 1912. This figure for July, 1911, was 67.7 per cent. The average earnings per car per day were \$2.49, indicating no increase or decrease over June, 1912. This figure for July, 1911, was \$2.17.

The accompanying table gives car balance and performance in the month covered by the report, and the two diagrams show car earnings and car mileage and certain car performance figures monthly from July, 1907.

General Review of Crop Conditions.

The department of agriculture gives average of yields this year of all crops combined, duly weighted by states, compared, first, with last year and, second, with the average yields of recent years, as follows:

States.	Production 1912 compared with		States.	Production 1912 compared with	
	1911. P. C.	Av'ge. P. C.		1911. P. C.	Av'ge. P. C.
Maine	104	102	North Dakota	180	142
New Hampshire	118	119	South Dakota	253	115
Vermont	118	118	Nebraska	131	92
Massachusetts	117	107	Kansas	171	117
Rhode Island	99	98	Above division		153.4 117.3
Connecticut	104	103	Kentucky	110	104
New York	115	105	Tennessee	100	102
New Jersey	115	106	Alabama	96	106
Pennsylvania	114	110	Mississippi	101	98
Above division		111.1 106.8	Louisiana	98	100
Delaware	111	112	Texas	141	122
Maryland	114	108	Oklahoma	182	99
Virginia	107	101	Arkansas	100	99
West Virginia	151	123	Above division		116.4 105.8
North Carolina	97	102	Montana	92	98
South Carolina	97	102	Wyoming	110	103
Georgia	88	98	Colorado	128	98
Florida	96	106	New Mexico	91	91
Above division		100.4 103.6	Arizona	96	112
Ohio	107	105	Utah	111	105
Indiana	108	102	Nevada	103	126
Illinois	121	110	Idaho	98	108
Michigan	102	101	Washington	100	105
Wisconsin	114	108	Oregon	116	117
Above division		112.2 106.1	California	103	106
Minnesota	144	123	Above division		99.3 102.9
Iowa	149	128	United States		115.8 107.7
Missouri	126	105			

Preliminary estimates of production have been made of certain crops as follows, with comparisons and farm prices November 1.

Crops.	Production (000 omitted).			Price.		
	1912. Preliminary.	1911.	1910.	Nov. 1, 1912.	Nov. 1, 1911.	Nov. 1, 1910.
Corn, bu.....	3,169,137	2,531,488	2,886,260	58.4	64.7	52.6
Wheat, bu.....	720,333	621,338	635,121	83.8	91.5	90.5
Oats, bu.....	1,417,172	922,298	1,186,341	33.6	43.8	34.9
Barley, bu.....	224,619	160,240	173,832	53.8	84.9	55.3
Rye, bu.....	35,422	33,119	34,897	68.8	83.1	71.6

Car Shortage.

Most of the railroads in the West are taking good care of their shippers, but of course shippers are not getting all the cars they are asking for. The average shipper, alarmed by the talk of a shortage, will order a hundred empty cars where he actually needs only fifty. He gets his fifty cars, but the company reports a shortage of fifty cars. This condition is prevalent all over the country, and particularly at the coal mines. The car shortage is largely exaggerated.—A "General Manager," in *Wall Street Journal*.

Automobiles Innocent.

The cry that the automobile is injuring the railroad by cutting into passenger traffic, is far from the point. Everything that makes for convenience of the people is for the general good, in which the railroads must inevitably share. There are four principal factors in our modern life contributing to the general convenience—the automobile, the electric light, the telephone and the bathtub. These factors mean that the advantages of

the city have been transferred to the country. That means the development of the country to a degree heretofore unimagined. Automobiles mean good roads. Good roads mean that the farmer can get his produce to market from sections heretofore unavailable. The telephone means that the farmer is no longer dependent upon Liverpool reports to fix prices for wheat. The more such factors we have the better off the railroads are, despite any trifling loss we may suffer in local passenger traffic on Saturdays and Sundays because people use their own cars for short excursions.—J. A. Munroe, *Union Pacific*.

Anthracite Coal Shipments.

The production of anthracite coal is now the heaviest in the history of mining. The amount produced in October was 6,665,321 tons, the shipments by the different roads being as follows:

October:	1912		1911	
	Tons.	Per Cent.	Tons.	Per Cent.
Philadelphia & Reading	1,434,923	21.53	1,273,412	20.31
Lehigh Valley	1,217,297	18.26	1,109,170	17.69
Central of New Jersey	938,297	14.08	913,048	14.56
Del., Lackawanna & W.	970,139	14.55	880,699	14.05
Delaware & Hudson	589,717	8.85	604,722	9.65
Pennsylvania	547,061	8.21	570,930	9.11
Erie	756,452	11.35	730,984	11.66
Ontario & Western	211,435	3.17	186,214	2.97
Total	6,665,321		6,269,179	

The Reading increased in October 161,511 tons; and the Lehigh Valley was second, with an increase of 108,127 tons. The full capacity of the mines was not tested, as there were holidays and strikes which interfered.

INTERSTATE COMMERCE COMMISSION.

The Western railways have filed tariffs under special permission from the commission, retaining the elevation allowance of $\frac{3}{4}$ cent per 100 lbs. on grain at the Missouri river until January 1, 1913.

The commission has postponed to January 1, 1913, the date on which the carriers are required to comply with the decision of the commission on freight rates between Shreveport, La., and Dallas, Tex.

Owners, operators and lessees of coal mines near Springfield, Ill., have filed a petition with the Interstate Commerce Commission asking a readjustment of the rates on coal as between various groups of Illinois mines.

The commission has decided that if a railway accepts payment for a ticket at one point and telegraphs the order for the ticket to another and makes no charge for the telegram, a rule explaining this fact must be published in the tariffs, so that all persons alike shall know that the telegram is free.

The commission has further suspended from November 16 until May 16 the supplements to the tariff of the Chicago & North Western, which advance rates for the transportation of fuel wood, sawdust and shavings from stations in Wisconsin and Michigan to Evanston, Ill., and other points.

The commission has denied the application of the Minneapolis, St. Paul & Sault Ste. Marie and the Chicago, Milwaukee & St. Paul for authority to advance the rates for the transportation of corn, oats and other commodities from points in Iowa, Minnesota and South Dakota to destination in adjacent states.

The commission has further suspended from November 12 until May 12 certain schedules in tariffs, which advance rates for the transportation of horses and mules, in carloads, from Chicago, St. Louis, and other points to stations in South Dakota, Nebraska, Kansas, Oklahoma, Colorado and Wyoming. These tariffs have already been once suspended (for four months to November 12).

The commission has suspended from November 12, until March 12, the tariffs of the Bangor & Aroostook, which advance a proportional rate on excelsior from Milo, Me., to Brownville Junction, Me., and from Monson Junction, Me., to Greenville, Me., to 5 cents per 100 lbs., except upon shipments to points in New York, New Jersey and Pennsylvania, to which a proportional rate of $3\frac{1}{2}$ cents per 100 lbs. will apply.

Reparation Awarded.

C. Hafer Lumber Company v. Chicago, Rock Island & Pacific.
Opinion by the commission:

The commission found that the rate charged for the transportation of lumber in carloads from Council Bluffs, Ia., to University Place and Ruskin, Neb., were unreasonable to the extent that they exceed 5.75 cents per 100 lbs. and 11.7 cents per 100 lbs., respectively. (25 I. C. C. 27.)

Mason Brothers v. Southern Pacific, et al. *Opinion by the commission:*

The complainant contends that the refrigeration charges from Lodi, Cal., to eastern points of destination during the seasons of 1908 and 1909 were unreasonable to the extent that they exceeded the refrigeration charges then in effect from Acampo, Cal., and Woodbridge. The commission found that Lodi is now on a parity with Acampo and Woodbridge and that the refrigeration charges from Lodi during the period in question were discriminatory to the extent that they exceeded the charges from Acampo and Woodbridge. (25 I. C. C., 35.)

Mixon-McClintock Co. v. St. Louis, Iron Mountain & Southern, et al. *Opinion by the commission:*

On a shipment of a carload of mules from Springfield, Mo., to Marianna, Ark., the complainant paid transportation charges in the sum of \$105.06, based upon a rate of \$51.70 for a 36-ft. car, from Springfield to Nettleton and 23 cents per 100-lbs. thence to Marianna. The complainant contends that the rate of 23 cents per 100-lbs. from Nettleton to Marianna is unreasonable. The commission found that on a minimum weight of 25,300 lbs. a rate of 12 cents per 100-lbs. from Nettleton to Marianna would yield a per ton mile revenue of 3.3 cents. The commission decided that the present rate of 23 cents per 100-lbs. was unreasonable to the extent that it exceeds 12 cents per 100-lbs. with a minimum weight of 25,300. (25 I. C. C. 8.)

Complaint Dismissed.

Hollingshead & Blei Company v. Pennsylvania Company.
Opinion by the commission:

The commission found that the demurrage charges occasioned by detention of a car of barrel heading at Cincinnati, Ohio, awaiting payment of freight charges thereon were properly assessed. (25 I. C. C.)

Griffen H. Deeves Lumber Company v. Alabama & Vicksburg, et al. *Opinion by the commission:*

The commission found that the charges for transportation of two carloads of lumber from Brandon, Miss., to Chicago, including the transit privilege at Jackson, Miss., were properly assessed. (25, I. C. C., 42.)

J. Charles McCullough v. Louisville & Nashville, et al. *Opinion by the commission:*

The commission found that the rates for the transportation of sunflower seed in carloads from Belle Rive, Dahlgren and Delafield, Ill., to Cincinnati, Ohio, were not charged in violation of the fourth section, and were not unreasonable. (25, I. C. C., 48.)

C. Hafer Lumber Co. v. Chicago & North Western, et al. *Opinion by the commission:*

The complainant contends that the rates for the transportation of lumber in carloads from Council Bluffs, Ia., to various points west of the Missouri river, which are 1½ cents per 100 lbs. higher than those from Omaha and Nebraska to the same points. The commission found, however, that the evidence was not conclusive. (25 I. C. C., 27.)

Talge Mahogany Company v. Southern Railway, et al. *Opinion by the commission:*

The complainant shipped 13 cars of imported mahogany logs from Mobile, Ala., to Knoxville, Tenn., at which point some of the logs were unloaded, the balance of the shipment being reconsigned to Indianapolis, Ind., in 13 cars. Charges of 19 cents per 100 lbs. for the transportation from Mobile to Knoxville and 26½ cents per 100 lbs., from Knoxville to Indianapolis were collected. The complainant contends that the joint through rate of 18 cents per 100 lbs. on imported logs from Mobile to Indianapolis should have been charged, and asked reparation. The

commission found that the logs were transported as two local shipments and that the charges were properly assessed. (25 I. C. C., 44.)

Faribault Furniture Company v. Chicago Great Western et al. *Opinion by the commission:*

The commission found that the failure to post a supplement to a tariff which contains no change in the rate, and misleading quotation by defendant carrier's local agent, are not circumstances affording cases for reparation, since the complainant could not have had the shipment moved in any other way than in that in which it did move and since the charges were assessed in accordance with the tariff. (25, I. C. C., 40.)

Platten Produce Company v. Chicago & North Western, et al. *Opinion by the commission:*

A carload of potatoes was shipped from Green Bay, Wis., to Galva, Ill., at which point it was reconsigned to Galesburg, Ill., which necessitated a back haul. The defendants collected charges for the transportation to Galva, plus the local rate for the back haul, plus demurrage charges for delay at Galva. The complainant contends that had the defendants moved the shipment by a different road Galva would have been intermediate to Galesburg. The commission found that the consignors did not give any specific routing instructions and that the carriers were not responsible for the necessity of the extra transportation service, and that, therefore, the shipment had not been misrouted. (25, I. C. C., 30.)

Jack Brothers v. Denver & Rio Grande. *Opinion by the commission:*

The fifth-class rate of 46 cents per 100 lbs. on wire and nails in carloads from Pueblo, Col., to Romeo, Col., on traffic originating at Pittsburgh, Pa., was not found to be unreasonable of itself, but the rates to the destination in question should have been constructed upon Walsenburg, Col., instead of Pueblo. The overcharge resulting from erroneous construction of rates will be refunded.

The commission, in sustaining the 46-cent rate, which is equal to 5.97 cents per ton per mile, said:

Romeo is situated 154 miles southwest of Pueblo on a branch line, the last 21 miles being narrow gage. The road is through a mountainous country, sparsely settled; and beyond Walsenburg traffic is light. Between Walsenburg and Alamosa the road rises from an elevation of 6,187 ft. at Walsenburg to 9,242 ft. at La Veta Pass. The grades range from 1.42 per cent. to 3 per cent., and the curvatures from 6 to 16 deg. The road was originally narrow gage, but was subsequently equipped with a third rail. This shipment moved over the broad-gage track. The defendant's witness testified that while some carload shipments are sent over the line in broad-gage cars, yet such instances are an exception to the operating practice, it being cheaper, as a rule, to transfer the lading to narrow-gage cars. (Unreported opinion No. 676.)

Dynamite Rates Reduced.

E. I. Dupont De Nemours Powder Company v. Central Railroad of New Jersey, et al. *Opinion by the commission:*

The commission found that the double first class rate for the transportation of dynamite from Knoxville, Tenn., to Copperhill on shipments originating outside of the state were unreasonable to the extent that they exceeded the first class rate. The complainant asked for reparation, but this was denied, as it was found that the consumers paid the charges. (25 I. C. C., 19.)

Lumber Rates Reduced.

Farrar Lumber Company v. Nashville, Chattanooga & St. Louis. *Opinion by the commission:*

The complainant contends that the rates on lumber from Dalton, Ga., to certain local points on the defendant's line intermediate to Nashville, Tenn., are unreasonable and also that the defendant should absorb the charge of \$2 per car for switching cars from the complainant's plant to the defendant's line. The commission found that the rates in question were unreasonable when compared to rates for similar service on other railroads and prescribed lower rates for the future. The commission also found that the failure of the defendant to absorb the switching charge above mentioned was unjust and unreasonable. Reparation was awarded. (25 I. C. C., 22.)

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1912.

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses				Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total.	Maintenance of way and structures, equipment.	Traffic.	Trans- portation.	General.	Total.					
Alabama & Vicksburg.....	143	\$92,786	\$40,703	\$133,489	\$18,879	\$3,738	\$51,453	\$5,089	\$104,225	\$38,953	—92	\$5,975	\$32,886	\$899
Ann Arbor.....	292	108,793	52,959	161,752	21,170	57,733	2,318,017	8,194	114,797	58,025	—760	13,929	43,336	—18,979
Atchafalaya & Santa Fe.....	8,203	5,634,026	2,100,822	7,734,848	1,451,246	159,875	2,318,017	178,720	5,313,933	3,038,121	341,722	2,696,399	393,290
Atlantic Coast Line.....	903	533,736	45,823	579,559	15,123	17,693	31,671	4,577	74,209	34,363	5,677	29,223	—5,709
Baltimore & Ohio Chicago Terminal.....	4,608 ²	1,634,111	652,171	2,286,282	429,232	425,741	932,244	74,738	1,905,254	550,587	125,000	425,587	—331,136
Bangor & Aroostook.....	77	176,833	64,943	241,776	20,629	23,141	63,595	4,969	113,110	39,276	954	19,115	21,115	8,564
Bessemer & Lake Erie.....	631 ¹	818,336	39,770	858,106	43,980	27,468	75,069	13,209	163,702	92,410	10,500	81,910	—71,361
Boston & Maine.....	2,244	2,373,792	1,702,065	4,075,857	91,140	132,846	198,282	8,480	438,998	430,903	9,000	421,903	—102,992
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
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Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	16,832	172,851	1,158,203	452,698
Buffalo & Susquehanna R. R.....	265	132,768	8,848	141,616	29,823	20,373	1,823,124	95,105	3,063,928	1,314,222	1			

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1912—(CONTINUED).

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses				Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	Total.	Maintenance— Way and structures, equipment.	Traffic.	Trans- portation.	General.	Total.					
New Orleans Great Northern.....	283	\$87,081	\$30,746	\$128,749	\$21,181	\$15,863	\$41,377	\$5,715	\$86,405	\$42,344	—\$42	\$1,850	\$40,452	—\$51,439
New Orleans, Mobile & Chicago.....	547	140,264	31,476	185,315	30,772	18,373	65,842	7,408	126,017	59,298	—87	4,155	55,056	4,137
New York Central & Hudson River.....	3,593	57,343,222	9,993,084	67,336,306	1,382,018	1,878,220	3,350,812	230,852	7,050,852	2,957,035	57,949	2,462,500	2,462,500	—529,588
New York, New Haven & Hartford.....	2,091	2,831,746	2,603,859	5,435,605	697,276	667,834	40,280	80,668	3,500,532	2,247,411	162,712	370,000	2,247,411	204,758
New York, Philadelphia & Norfolk.....	112	226,711	45,633	272,344	29,160	25,579	2,038	2,038	222,011	76,149	.....	7,900	68,249	—3,872
Northern Central.....	473	856,178	227,058	1,083,236	137,542	179,507	502,565	27,434	862,031	294,882	508	38,700	256,690	60,544
Northern Pacific.....	6,233	4,895,640	1,497,335	6,392,975	1,020,818	671,422	1,018,807	87,913	3,893,856	2,882,909	46,700	306,000	2,623,609	179,000
Oregon-Washington R. & Nav. Co.....	1,920	1,206,198	529,194	1,735,392	187,950	162,578	44,016	44,016	1,005,289	831,211	—6,607	739,862	51,588	15,888
Pecos & Northern Texas.....	125	1,065,337	44,547	1,109,884	230,377	28,435	6,539	6,268	139,145	81,232	.....	5,625	75,607	16,898
Pennsylvania Co.....	1,751	4,282,762	955,587	5,238,349	839,566	975,887	80,049	99,284	3,829,276	1,969,591	2,033	248,322	1,723,302	149,561
Pennsylvania Railroad.....	4,021	10,930,669	3,330,808	15,261,477	1,966,604	3,079,715	176,964	360,695	10,712,042	4,566,536	—10,969	654,190	3,901,377	330,565
Pere Marquette.....	2,330	979,553	409,656	1,389,209	190,975	219,028	589,819	37,883	1,075,204	435,642	3,716	56,939	402,419	—15,784
Philadelphia, Baltimore & Washington.....	713	886,683	756,101	1,642,784	295,053	278,972	701,246	49,007	1,350,889	463,326	.....	52,176	411,150	—47,082
Pittsburgh & Lake Erie.....	221	1,407,275	153,642	1,560,917	145,509	250,202	343,748	25,291	786,052	827,709	5	31,000	796,714	76,755
Pittsburgh, Cincinnati, Chic. & St. Louis	1,467	2,726,685	794,074	3,520,759	620,036	666,682	69,972	70,933	2,713,228	1,179,457	—1,719	144,800	1,032,938	—24,483
Rutland.....	468	167,039	136,766	303,805	44,020	72,640	131,077	6,477	238,990	85,624	.....	13,173	72,451	—30,838
St. Joseph & Grand Island.....	319	94,673	37,642	132,315	19,089	17,687	66,480	5,334	125,072	19,131	235	6,396	12,970	—32,562
St. Louis, San Francisco & Texas.....	244	92,882	31,929	124,811	26,361	17,864	52,864	5,085	103,920	27,985	.....	1,217	26,768	12,020
St. Louis Southwestern.....	906	552,116	128,977	681,093	78,800	95,743	26,976	24,798	390,309	319,861	474	24,058	295,329	58,249
San Antonio & Aransas Pass.....	727	434,439	135,558	569,997	58,127	57,748	157,614	10,454	290,399	298,194	.....	12,000	286,194	59,566
Southern.....	7,034	3,497,789	1,620,641	5,118,430	598,087	897,164	1,774,372	156,566	3,703,730	1,844,357	5,868	202,297	1,647,928	8,562
Southern in Mississippi.....	281	40,049	29,929	69,978	28,939	27,700	3,278	3,768	79,169	7,809	.....	6,761	1,048	—16,119
Toledo & Ohio Central.....	443	400,874	63,610	464,484	74,739	83,049	132,890	8,406	325,554	167,682	—889	20,294	146,499	—51,903
Trinity & Brazos Valley.....	463	213,960	52,494	266,454	28,659	35,093	98,423	11,163	183,399	90,610	.....	4,625	85,985	36,938
Union Pacific.....	3,575	3,616,530	1,007,552	4,624,082	454,359	476,463	1,198,168	101,575	2,313,647	2,676,250	2,842	180,898	2,495,194	108,937
Union R. R. of Pennsylvania.....	31	.....	.....	.....	24,166	84,420	139,958	4,026	252,750	187,096	3,196	4,750	185,542	959
Union R. R. of Baltimore.....	9	116,322	25,919	142,241	13,787	9,058	727	2,708	126,264	126,264	.....	5,245	121,019	15,148
Vandalia.....	827	669,113	225,212	894,325	126,373	161,716	26,041	16,927	665,162	356,795	.....	29,944	326,851	156,456
Vicksburg, Shreveport & Pacific.....	171	79,231	42,537	121,768	28,994	23,530	3,278	6,346	99,255	32,751	.....	6,300	93,251	1,034
Virginia.....	474	371,772	28,573	400,345	57,990	76,714	103,976	9,156	233,652	158,320	6,753	17,400	147,673	—12,021
West Jersey & Seashore.....	356	144,655	417,172	561,827	89,233	93,532	236,694	13,477	450,446	160,990	—2,064	30,123	128,803	—17,180
Alabama & Vicksburg.....	143	\$284,113	\$126,701	\$410,814	\$59,534	\$78,171	\$10,706	\$15,289	\$319,395	\$119,922	—\$875	\$17,925	\$101,122	\$26,155
Ann Arbor.....	292	324,130	177,462	501,592	68,308	63,653	12,462	24,403	347,973	188,492	205	41,790	146,907	—32,824
Artesian, Topeka & Santa Fe.....	8,201	15,917,097	6,374,205	22,291,302	4,103,086	4,068,745	474,557	498,016	15,809,025	8,269,702	.....	1,001,998	7,267,702	1,062,474
Atlantic Coast Line.....	4,608	4,803,791	2,029,625	6,833,416	3,356,622	3,356,622	134,242	221,806	5,753,745	1,625,647	892	17,031	62,647	—22,780
Baltimore & Ohio Chicago Terminal.....	77	6,952	472,319	479,271	66,885	66,178	187,312	12,947	335,471	136,848	2,853	57,346	82,355	54,513
Bangor & Aroostook.....	631	484,433	188,458	672,891	75,224	143,834	11,991	37,305	503,579	221,645	.....	31,500	190,145	—90,806
Bessemer & Lake Erie.....	204	274,835	133,002	407,837	35,532	41,875	29,742	27,345	133,240	158,298	.....	27,000	1,561,298	—12,233
Boston & Maine.....	2,244	7,127,925	5,148,982	12,276,907	1,538,591	1,777,575	116,057	86,170	9,124,737	4,099,081	62,923	517,552	3,644,452	946,817
Buffalo & Susquehanna R. R.....	265	392,073	29,146	421,219	88,176	66,220	3,770	17,686	319,361	114,306	.....	6,600	107,706	16,159
Buffalo & Susquehanna R. R.....	91	126,958	36,508	163,466	30,284	81,891	1,535	8,082	186,401	15,616	179	4,500	19,937	—5,329
Buffalo, Rochester & Pittsburgh.....	570	2,403,635	350,315	2,753,950	453,339	548,884	36,077	54,905	1,944,495	922,327	240	51,000	871,567	87,371
Carolina, Clinchfield & Ohio.....	238	541,579	53,877	595,456	44,125	55,445	20,626	20,170	245,047	364,881	.....	24,000	340,881	82,435
Carolina, Clinchfield & Ohio of S. C.....	18	26,152	5,010	31,162	2,325	2,400	3,104	1,147	13,022	18,970	.....	1,500	17,470	2,808
Central of Georgia.....	1,915	2,031,196	1,068,558	3,099,754	493,968	623,487	104,267	118,346	2,486,126	893,838	20,156	154,350	759,644	—69,975
Central New England.....	277	834,629	102,009	936,638	131,346	70,392	4,002	5,762	461,181	514,737	881	30,000	485,638	149,513
Charleston & Western Carolina.....	341	279,803	98,884	378,687	88,895	71,945	10,312	13,283	348,415	51,746	.....	15,000	36,746	—81,726
Chicago & Alton.....	1,026	2,497,107	1,210,877	3,707,984	552,052	814,484	1,290,176	91,981	2,865,141	1,121,877	—5,083	114,000	1,002,794	—18,646
Chicago & Northwestern.....	7,970	13,733,322	6,040,599	19,773,921	3,039,171	2,968,014	377,369	377,369	14,547,612	7,127,758	29,246	909,000	6,248,004	—58,082
Chicago, Burlington & Quincy.....	9,075	15,733,430	6,508,927	22,242,357	3,105,810	3,836,036	428,921	577,291	15,065,693	9,326,535	—21,918	824,022	8,480,585	1,190,134
Chicago Great Western.....	1,496	2,381,362	917,309	3,298,671	440,337	490,737	143,477	100,630	2,502,452	1,067,284	—314	105,362	961,408	94,569
Chicago, Indiana & Southern.....	359	890,165	89,236	979,401	1,011,839	276,234	24,697	24,064	806,677	205,162	2,454	39,000	168,616	95,962
Chicago, Milwaukee & Puget Sound.....	2,081	4,413,148	814,179	5,227,327	576,538	1,517,728	151,783	69,784	2,917,406	7,172,922	54,754	225,000	2,347,676	779,595
Chicago, Milwaukee & St. Paul.....	7,511	12,215,777	4,693,181	16,908,958	2,470,350	2,413,493	6,499,773	214,112	11,955,549	6,718,217	51,533	706,686	6,063,065	2,576,976
Chicago, Peoria & St. Louis.....	255	338,717	98,846	437,563	63,080	98,928	21,519	16,637	394,559	64,237	.....	12,900	51,337	—2,873
Chicago, Rock Island & Gulf.....	477	530,329	166,220	696,549	126,814	70,283	31,137	22,557	509,597	239,471	—1,810	24,366	213,295	—14,205
Chicago, Rock Island & Pacific.....	7,566	11,414,559	5,457,958	16,872,517	2,755,104	2,434,127	467,520	417,772	12,623,072	5,298,143	—41,395	693,606	4,563,142	990,744
Chicago, St. Paul, Minneapolis & Omaha	1,744	2,658,581	1,441,630	4,100,211	697,610	563,371	1,631,742	98,409	3,076,021	1,310,091	6,926	208,599	1,108,418	169,510
Chicago, Terre Haute & Southeastern.....	351	406,048	58,299	464,347	98,102	475,864	8,717	22,638	371,828	404,036	—399	30,000	73,637	—46,695
Cincinnati, Hamilton & Dayton.....	1,015	2,022,200	483,127	2,505,327	310,646	464,846	62,641	5,619	1,935,215	860,539	.....	99,238	761,291	10,624
Cincinnati Northern.....	248	284,399	73,335	357,734	66,456	66,456	7,957	9,864	262,512	82,675	.....	15,900	66,775	3,884
Cleveland, Cincinnati, Chic. & St. Louis	2,012	5,726,180	2,361,334	8,087,514	1,069,299	1,475,723	202,122	165,141	5,991,283	2,805,766	1,927	285,000	2,522,693	55,378

Average mileage operated during previous period: 404; 3,591; 20,472; 30,617; 31,186; 31,416; 33,378; 33,331; 33,215; 30,797; 7,089; 33,502; 33,355; 17,613; 2,453; 3,628; 4,225; 5,573; 9,754; 7,059; 7,551; 9,240; 10,211. — Indicates Deficits, Losses and Decreases.

REVENUES AND EXPENSES OF RAILWAYS.

THREE MONTHS OF FISCAL YEAR, 1913—(CONTINUED).

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses		Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.			
		Freight.	Passenger.	Total.	Way and structures, equipment.	Traffic.						Trans- portation.	General.	Total.
Colorado Midland	338	\$421,979	\$105,972	\$527,951	\$106,303	\$22,688	\$245,652	\$16,301	\$475,073	\$89,056	—\$756	\$23,600	\$64,700	—\$32,846
Cumberland Valley	162	620,391	203,335	823,726	94,686	13,947	255,136	22,898	543,336	319,065	1,518	16,835	303,748	59,427
Delaware & Hudson Co.—R. R. Dept.	854 ¹	5,066,520	1,095,424	6,161,944	3,363,914	799,579	2,014,882	161,808	3,590,797	2,772,728	—51,332	2,574,366	187,460	317,259
Delaware, Lackawanna & Western	2,554 ²	7,461,040	2,273,873	9,734,913	1,438,802	1,496,628	2,879,123	187,934	6,212,921	4,063,267	116,057	506,820	317,298	38,982
Denver & Rio Grande	2,554 ³	4,761,784	1,637,167	6,398,951	1,108,826	1,165,965	2,023,320	183,072	4,635,898	2,077,942	24,477	1,882,419	38,982	38,982
Denver, Northwestern & Pacific	215	213,742	142,948	356,690	58,262	49,795	6,132	10,745	225,786	145,834	.....	10,500	135,334	—26,056
Detroit & Mackinac	411 ⁴	201,903	104,053	305,956	326,233	55,374	112,591	8,618	221,868	104,365	2,055	26,048	80,372	2,267
Detroit River Tunnel	2	355,667	49,309	404,976	282,664	5,782	24,346	42	38,745	243,919	.....	13,500	230,419	—172
Detroit, Toledo & Ironont	441	3,010,117	60,315	3,070,432	436,060	74,626	183,524	16,414	326,146	111,934	—11	18,000	93,923	33,885
Duluth & Iron Range	274 ⁵	3,101,117	60,315	3,070,432	3,097,649	276,025	4,064	32,927	1,060,306	2,037,343	10,128	146,223	1,901,338	—57,967
Duluth, Missabe & Northern	351 ⁶	1,393,353	115,682	1,509,035	285,235	259,499	5,967	32,707	1,109,059	2,255,354	14,833	158,859	2,081,328	—24,577
El Paso & Southwestern Co.	902	1,646,958	242,789	1,889,747	1,982,249	194,884	534,473	70,876	1,116,023	866,226	—4,886	66,714	794,626	278,330
Elgin, Joliet & Eastern	823 ⁷	2,981,246	242,789	3,224,035	348,935	13,773	803,277	47,058	1,696,877	1,551,440	.....	60,099	1,490,441	48,154
Florida East Coast	642	399,153	272,735	671,888	202,716	149,766	342,033	31,372	740,470	40,437	—1,714	46,500	31,777	10,166
Fort Worth & Denver City	454	769,615	431,162	1,200,777	780,907	126,375	386,880	41,343	770,703	493,072	—1,532	35,100	456,440	—58,648
Georgia, Southern & Florida	395	297,995	209,378	507,373	583,902	64,529	23,271	28,017	475,318	108,584	.....	31,878	76,706	—27,731
Grand Rapids & Indiana	586 ⁸	790,853	634,461	1,425,314	154,220	180,955	36,628	45,226	1,061,880	480,340	1,385	413,650	71,778	—1,178
Gulf & Ship Island	308	342,411	114,253	456,664	68,756	84,848	7,736	24,489	322,457	1,696,659	.....	15,207	154,452	12,148
Gulf, Colorado & Santa Fe	1,596 ⁹	2,564,755	843,236	3,407,991	470,761	450,153	1,114,062	91,628	2,195,850	1,086,669	.....	121,306	965,363	483,206
Indiana Harbor Belt	105 ¹⁰	751,667	751,667	1,503,334	470,761	450,153	1,114,062	91,628	2,195,850	1,086,669	.....	121,306	965,363	483,206
Indiana, Chicago & Santa Fe	1,596 ⁹	2,564,755	843,236	3,407,991	470,761	450,153	1,114,062	91,628	2,195,850	1,086,669	.....	121,306	965,363	483,206
Indianapolis & St. Louis	1,586	1,780,149	568,379	2,348,528	2,487,937	303,801	926,050	62,252	1,672,941	814,992	—130	87,445	727,417	238,741
Mobile & Ohio	1,114	2,367,034	398,525	2,765,559	2,935,383	357,055	1,046,467	89,081	2,154,967	770,416	—4,087	89,577	676,752	48,757
Monongahela	1,65	373,435	7,214	380,649	385,156	7,214	73,961	5,904	174,414	210,714	.....	6,000	204,714	61,787
Nashville, Chattanooga & St. Louis	1,231 ¹¹	2,142,882	864,530	2,997,412	495,757	600,327	1,196,225	81,094	2,491,965	729,626	—2,042	76,248	651,336	—3,998
New Orleans & North Eastern	196	653,245	164,184	817,429	98,428	175,095	360,460	31,324	697,638	186,020	—308	37,200	148,512	—56,819
New Orleans Great Northern	283	302,548	95,697	398,245	429,619	6,901	126,667	20,302	268,125	161,093	—151	5,550	155,392	4,061
New Orleans, Mobile & Chicago	547 ¹²	426,283	97,713	523,996	561,204	96,315	197,952	22,212	384,660	176,344	—194	12,466	163,884	25,813
New York Central & Hudson River	3,595 ¹³	16,292,960	10,037,580	26,330,540	29,212,511	4,007,437	5,581,523	667,076	20,324,599	8,887,912	87,386	1,581,489	7,393,809	—972,673
New York, New Haven & Hartford	2,091	8,724,676	7,857,621	16,582,297	18,149,190	1,968,877	6,172,398	402,069	10,637,007	7,512,183	410,090	1,006,000	6,516,273	1,189,002
New York, Philadelphia & Norfolk	112	765,494	153,258	918,752	79,165	160,208	401,307	37,750	691,182	304,814	.....	23,700	281,114	32,772
Northern Central	473 ¹⁴	2,441,064	686,217	3,127,281	3,337,619	423,205	1,487,846	75,465	2,639,327	698,292	2,536	116,099	584,729	165,669
Northern Pacific	6,233 ¹⁵	12,726,388	4,679,199	17,405,587	21,633,639	313,390	5,588,134	248,791	11,238,800	7,323,870	146,119	918,000	6,551,989	337,611
Oregon-Washington R. R. & Nav. Co.	1,920 ¹⁶	3,118,307	1,544,188	4,662,495	4,954,139	425,431	1,612,266	130,212	2,893,554	2,060,585	—1,003	254,226	1,805,356	110,841
Pecos & Northern Texas	125	451,394	140,213	591,607	545,510	86,272	185,951	18,899	426,016	195,349	.....	16,876	178,473	51,427
Pennsylvania Co.	1,751 ¹⁷	13,559,036	2,788,242	16,347,278	2,472,146	2,970,678	248,711	5,579,507	11,556,038	6,465,467	—1,939	691,607	5,771,921	1,057,805
Pennsylvania Railroad	4,021 ¹⁸	32,672,040	10,140,880	42,812,920	5,807,103	8,985,634	573,144	15,226,068	31,619,149	14,123,226	—163,851	1,829,070	12,130,305	2,001,863
Pere Marquette	2,330 ¹⁹	2,746,332	1,364,334	4,110,666	4,508,749	606,094	1,754,487	113,748	3,289,865	1,218,884	13,645	171,200	1,061,329	—16,708
Philadelphia, Baltimore & Washington	713	2,828,327	2,181,271	5,009,598	5,517,088	886,636	2,223,666	81,218	2,133,191	1,260,002	.....	156,530	1,204,372	—97,608
Pittsburgh & Lake Erie	221 ²⁰	4,400,798	473,580	4,874,378	5,055,693	481,355	1,017,653	132,875	4,136,189	2,688,716	—369	93,000	2,593,347	391,353
Pittsburgh, Cincinnati, Chic. & St. Louis	1,467	8,003,911	2,305,734	10,309,645	11,418,678	1,663,698	3,797,697	207,832	7,930,097	3,488,582	—2,421	425,145	3,061,016	279,404
Rutland	468	516,546	384,239	900,785	1,030,095	112,183	378,593	18,359	728,274	301,821	.....	41,060	260,761	6,867
St. Joseph & Grand Island	319	296,511	118,955	415,466	451,742	86,079	142,988	15,525	356,633	95,109	—399	19,188	73,522	—38,564
St. Louis, San Francisco & Texas	244	255,652	92,151	347,803	368,707	49,168	182,801	15,386	292,542	76,165	.....	3,650	72,515	50,529
St. Louis Southwestern	906 ²¹	1,557,891	388,701	1,946,592	2,032,455	294,842	496,192	73,587	1,179,341	853,114	—1,767	72,174	779,173	123,040
San Antonio & Aransas Pass	727	1,003,775	404,855	1,408,630	1,467,579	199,010	464,637	30,707	870,912	596,667	.....	36,000	560,667	90,239
Southern	7,034 ²²	10,358,294	5,035,003	15,393,297	16,644,291	2,165,704	5,444,727	470,853	11,364,639	5,279,652	2,649	607,117	4,675,184	147,613
Southern in Mississippi	281	130,569	84,716	215,285	232,202	7,273	107,025	11,461	336,213	804	.....	20,285	19,481	—46,453
Toledo & Ohio Central	443	1,195,321	167,040	1,362,361	1,483,572	250,182	469,008	26,228	1,022,785	460,787	—2,084	60,883	397,820	—95,577
Trinity & Brazos Valley	463	430,472	159,177	589,649	613,037	115,294	30,676	30,748	525,731	87,306	.....	12,625	74,681	43,380
Union Pacific	3,575 ²³	9,711,456	3,075,051	12,786,507	13,917,476	1,324,033	3,334,828	314,625	6,648,449	7,269,027	9,143	536,681	6,741,489	666,616
Union R. R. of Pennsylvania	31	1,416,793	.....	1,416,793	86,752	254,534	434,028	9,242	784,960	631,833	4,362	14,250	621,945	56,784
Union R. R. of Baltimore	9	340,743	71,483	412,226	30,607	2,186	15,744	7,926	56,463	360,387	.....	15,735	344,652	36,452
Vandalia	827	1,910,012	654,511	2,564,523	2,882,778	413,953	989,060	54,408	2,037,348	845,430	.....	88,575	756,858	264,620
Vicksburg, Shreveport & Pacific														

Lumber Rates Increased.

In re investigation and suspension of advances in rates by carriers for transportation of lumber and articles taking lumber rates from stations on the Alabama Great Southern and other points to St. Louis, Mo., and other points. Opinion by Commissioner Clark:

The proposed increased rates on lumber from groups in the southeast to Cairo, Ill., proper, made in compliance with the commission's findings in *Norman Lumber Company v. Louisville & Nashville*, 22, I. C. C., 239, were not found unreasonable. The proposed increased rates from certain points in the same territory to St. Louis, Mo., which bring such points into proper relationship with other points in the same territory, not found unreasonable. The order of such suspension was vacated. (24 I. C. C., 686.)

Changes in Live Stock Rates.

In re investigation and suspension of advances in rates by carriers for the transportation of live stock from points in the state of New Mexico to Kansas City, Mo., and between other points. Opinion by Chairman Prouty:

The commission found that the present rates on beef cattle from points in Texas to Kansas City were just and reasonable and that the proposed advances in the Southwestern lines' tariff should be permitted, with a few exceptions which were mentioned in the report. The rates from New Mexico need to be revised.

The proposed rates in the supplement to the tariff of the Atchison, Topeka & Santa Fe on cattle and calves, on sheep and goats in single deck cars, and in double deck cars, are just and reasonable and should be permitted. The proposed rate on hogs in this tariff is unjust and the commission ordered that the proposed rate on sheep in single deck cars should apply to hogs in single deck cars in future.

The proposed rate in the tariff of the Chicago, Rock Island & Pacific from points in New Mexico on beef cattle, on sheep and goats in single deck cars and on hogs should be permitted.

The proposed increases in the rates on beef cattle from points in New Mexico and Colorado in the tariff of the Colorado & Southern should be permitted. (25 I. C. C., 63.)

Lumber Rates to Ohio River Crossing.

In re lumber rates from the south to Ohio river crossings. Opinion by Chairman Prouty:

The carriers which transport lumber from various points of production in the south to the Ohio river violate in some instances the rule of the fourth section, and ask to be allowed to continue to make higher rates to intermediate points. The commission found that a carrier, originating traffic in one group and carrying it upon its way to the Ohio river through another group which takes a higher rate than the group in which the traffic was originated, should be accorded relief from the fourth section. The Illinois Central should be allowed to maintain higher rates to intermediate points on gum and cotton wood lumber to the Ohio river, where competition with the Mississippi river or some other stream emptying into that river is possible. The Nashville, Chattanooga & St. Louis should be allowed to violate the fourth section in making its rates from lumber producing territory on its line to Ohio river crossings because of water competition.

Lower rates should not be charged from the end of a branch than from points nearer the main line on the same branch, even though there is competition at the end of the branch line. Nashville, Chattanooga & St. Louis should be permitted to charge a lower rate from Columbia to Nashville than from points more distant than Columbia, because the line of its competitors, the Louisville & Nashville, is more direct from Columbia to Nashville than its own.

The application of the Illinois Central with respect to its rates upon pine lumber will be granted except in instances named in the report.

To the extent that water competition justifies departures from the fourth section at and from Memphis relief should be granted, but the commission cannot upon the mere suggestion that this is a water competitor's point and without further showing grant unlimited relief from the rule of the fourth section. Relief was not granted to Trotters Point, Memphis or Brockport.

The carriers interested in these applications will be given until December 1, 1912, in which to file with the commission a statement showing the exact relief in detail to which they consider themselves entitled under the terms of this opinion. Upon receiving such statements appropriate orders will be issued. (25 I. C. C., 50.)

STATE COMMISSIONS.

The Michigan Railroad Commission has ordered the Minneapolis, St. Paul & Sault Ste. Marie to reduce its passenger rate to 2 cents a mile, because the company's annual report showed more than \$1,200 per mile earned on passenger business during last year.

The Kansas public utilities commission has rendered a decision in the joint rate case, holding that reasonable joint rates over two lines of railway on carload shipments of commodities named in the Kansas maximum rate law of 1909, shall not exceed the continuous mileage rates by amounts greater than differentials fixed by the commission in its order.

Application has been filed with the California Commission by the Southern Pacific for permission to increase the charge for switching freight in carloads from transfer tracks of the State Belt Railway to industrial tracks and private sidings within the switching limits of San Francisco from \$2.50 per car to 25 cents per ton with a maximum charge of \$5 per car.

The California Railroad Commission has begun plans for a valuation of the electric railways of the state. The valuation of steam railroads has been in progress for several months. An order has been issued calling upon the electric roads to furnish necessary inventories and statements to enable the commission to proceed with the appraisalment of their properties.

The railroad commission of Georgia has issued an order, to take effect February 1 next, requiring a modification in the practice of the roads of that state in the matter of mileage tickets. For intrastate journeys which are begun at places of less than 10,000 population, according to the census of 1910, coupons from the mileage or scrip books must be accepted on trains. In the larger places the carriers may continue to enforce their present rule of requiring the coupons to be surrendered at the station ticket office in exchange for tickets. Two of the five commissioners dissented from this opinion.

On an opinion rendered by Commissioner Milo R. Maltbie, the New York State Public Service Commission, First District, has denied the application of the Mid-Crosstown Railway Company, New York City, for permission to issue \$500,000 stock, \$200,000 in first mortgage 5 per cent. bonds and \$300,000 5 per cent. adjustment income bonds. The Mid-Crosstown is a reorganization of the 28th and 29th streets Crosstown. The Third Avenue Railway Company now operates the road and the Mid-Crosstown intends to sell the property to the Third Avenue Railway Company. The commission holds that there is no justification for the formation of a new company and the issuance of securities merely for the purpose of selling out; Third Avenue can buy direct from the old company. The opinion also discusses the merits of the case and finds that the value of the physical property and the earning capacity of the company are not sufficient, in view of liabilities aggregating more than \$163,000 which must be paid, to justify the issuance of securities in the amounts proposed.

COURT NEWS.

The Commerce Court has sustained the order of the interstate commission reducing rates on fruit and vegetables from points on the Florida East Coast Railroad to northern cities, denying the application of the railroad company for an injunction. The road, in its application, averred that the order would cause a reduction of \$131,000 in its annual gross revenues, and claimed that this would amount to confiscation of property; but the court declares that no question of confiscation could possibly arise in these circumstances. The court sustained the position taken by the Interstate Commerce Commission that the immense cost of constructing the "over-sea" extension to Key West should not

be considered in the establishment of the reasonableness of freight rates northward from points in Florida on the older part of the road.

Decision as to "Lateral Branches."

The Supreme Court of the United States holds that the Baltimore & Ohio Southwestern and the Norfolk & Western cannot be compelled to grant physical connections with an electric interurban road, the Cincinnati & Columbus Traction Company, at several crossings in southern Ohio. The decision sustains the opinion of the Commerce Court and reverses an order of the Interstate Commission.

The principal question in the case was whether an electric railway is a "lateral branch line of railroad" within the meaning of the interstate commerce act. Justice Holmes in announcing the court's opinion said the court would not determine the scope of the meaning of "lateral branch," but would rest its decision on the finding that in this case the roads intercepted in such a manner and were built with such purposes that the electric could not be termed a lateral branch.

In the decision of the case a word of caution was dropped by the Supreme Court to the Interstate Commerce Commission against issuing orders based on its own investigations rather than on testimony of witnesses. The decision cites the commission's statement that this had been done when it issued the order. The commission held that the electric was a "lateral branch line of railroad" within the meaning of the law; but the court sustains the Commerce Court in holding that the electric line appeared to have been built without regard to the existence of the steam roads and was not a "lateral branch."

"We remark that the commission stated in its report that it based its conclusion more largely upon the commission's own investigation than upon the testimony of witnesses. . . . It would be a very strong proposition to say that the parties would be bound in the higher courts by a finding based on specific investigations made in the cases without notice to them. Such an investigation is quite different from a view by a jury taken with notice and subject to the order of a court; and different again from the question of the right of the commission to take notice of results reached by it in other cases when its doing so is made a part of the record and the facts thus noticed are specified so that matters of law are saved."

The court did not pass on the question of the power of the commission to require steam roads to grant connections with electric lines as such.

ELECTRIFICATION OF FRENCH RAILWAYS.—For some time past the French State Railway authorities have been conducting electrification experiments on a stretch of the Western Railway, and it is reported that results have been so satisfactory that it has been decided to go into the matter on a larger scale. Contracts for 100 electric locomotives have just been placed with French and Belgian builders.

PROPOSED SPANISH RAILWAY.—Surveys have been made and plans have been submitted for official approval of the construction of a railroad from Alcaraz in the central eastern portion of the province of Albacete, southeast to Baeza in the central portion of the province of Jaen, about 80 miles. This line would establish direct communication between the eastern districts of the peninsula of Andalusia. The total cost of the line is estimated at about \$4,320,000.

URUGUAY GOVERNMENT RAILWAY POLICY.—A project for a system of state railways was recently sent to the chamber by the President of Uruguay. The object is to complement existing railways so as to open for colonization in the interests of agriculture zones now utilized for raising stock. The project provides for a main or trunk line from Montevideo to Santa Rosa, in the extreme northwestern corner; a branch from the trunk line passing through Minas to the northeastern corner to Artigas; an extension from the trunk line at Florida through Trinidad to Paysandu; one to the east from Sarandi del Yi through Treinta y Tres to join the northeastern branch at Vergara; a western branch from the main line, passing through La Lata to Nueva Palmira, on the Uruguay river; and an extension from the Eastern Railway at San Carlos to Rocha; also a short branch from the main line to Salto.

Railway Officers.

Executive, Financial and Legal Officers.

See an item in Supply Trade News regarding new officers of the Pullman Company.

M. E. Ingalls has retired from the position of chairman of the board of the Cleveland, Cincinnati, Chicago & St. Louis, having declined re-election.

Hale Holden, assistant to the president of the Chicago, Burlington & Quincy, was elected a vice-president at a meeting of the board of directors, held in New York City, on November 8.

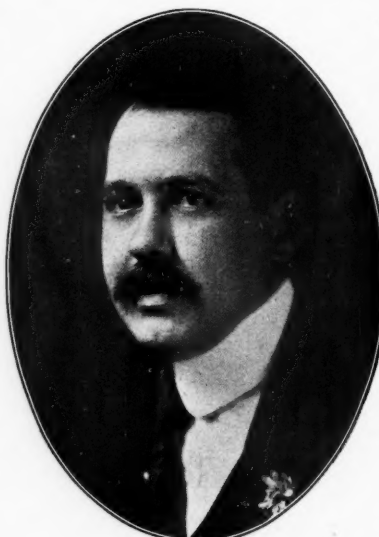


H. Holden.

In addition to his duties as vice-president, he will perform such other duties as may be assigned to him. Mr. Holden was born August 11, 1869, at Kansas City, Mo., and was educated at Williams College and Harvard Law School. For several years previous to his connection with the Burlington directly he practiced law in Kansas City as a member of the firm of Warner, Dean, McLeod & Holden, who were local attorneys for the Chicago, Burlington & Quincy. He came to Chicago in July, 1907, to take the position of general attorney of the Burlington, and on January

1, 1910, was made assistant to the president. Mr. Holden made a special study of the interstate commerce law, and represented the stockholders of the Great Northern in the Minnesota rate case, the litigation of which consumed three and one-half years' time.

J. M. Fitzgerald, whose election as vice-president of the Western Maryland, with headquarters at Baltimore, Md., was recently announced in these columns, has been elected president of that



J. M. Fitzgerald.

company, effective January 1, succeeding Alexander Robertson. Mr. Fitzgerald was born near Philadelphia, Pa., on April 26, 1877, and was educated in the public schools, and the School of Technology in Philadelphia. He began railway work in 1894, with the Columbus, Sandusky & Hocking in the general offices at Columbus, Ohio, and in August, 1896, he was made purchasing clerk and general storekeeper. In March of the following year he went to the Choctaw, Oklahoma & Gulf, now a part of the Chicago, Rock Island & Pacific, in the engineering department at South

McAlester, Okla., and was engaged in both construction and maintenance of way work. In August, 1898, he was appointed assistant general manager of the Virginia & Southwestern, at Bristol, Va., in charge of the operating department, and assistant to vice-president of the Virginia Iron, Coal & Coke Company. From April, 1900, to August, 1904, he was in charge of

the mining operations of the Empire Steel & Iron Company, and was then with B. Nicholl & Company in charge of their mining operations. In June, 1909, he was elected vice-president of the Pittsburgh Terminal Railroad & Coal Company. On April 1, 1912, he was elected president of the Davis Coal & Coke Company, and on October 16, 1912, was elected vice-president of the Western Maryland and has since been elected president of the same road, effective January 1, 1913. Mr. Fitzgerald will continue until January 1 as vice-president, performing the duties of president during the continued absence of Mr. Robertson. He is a member of the American Institute of Mining Engineers, the Engineers' Society of Western Pennsylvania, the American Mining Congress, the Coal Mining Institute of America, and the Iron & Steel Institute of England.

James McCrea, president of the Pennsylvania Railroad, has resigned, the resignation to take effect January 1; and the board of directors, at their meeting in Philadelphia, November 13, when the resignation was presented, elected Samuel Rea president. Mr. McCrea is 64 years old. He has been president of the Pennsylvania since January, 1907, when he succeeded the late A. J. Cassatt. He began his railroad service in the engineering department in 1865, when he was a rodman on the Connellsville & Pennsylvania. He was superintendent of the Middle division four years, 1878-82, and was for about 25 years on the Lines West of Pittsburgh, rising to the chief position on those lines, that of first vice-president. Mr. McCrea's resignation is said to have been decided on only last week, following the advice of his physician that his health imperatively demanded a cessation of the hard work of the presidency. Samuel Rea has been first vice-president of the Pennsylvania since March, 1911, when he succeeded Charles E. Pugh in that office. Mr. Rea is 57 years old. He began his railroad service in 1871, and came up through the engineering department. He was made assistant to Vice-President DuBarry in 1883. In the years 1891-92 he was out of the service because of ill health. He was elected fourth vice-president in June, 1899.

Operating Officers.

O. E. Slater has been appointed trainmaster of the Ft. Dodge, Des Moines & Southern, with headquarters at Boone, Ia.

O. C. Wyman has been appointed trainmaster of the Cleveland, Cincinnati, Chicago & St. Louis, with office at Wabash, Ind.

A. A. Matthews, engineer of maintenance of the Missouri, Kansas & Texas of Texas, has been appointed superintendent of the Waco district, with headquarters at Waco, Tex., to succeed F. S. James, resigned.

M. H. Cahill, who recently resigned as superintendent of the Newark division of the Baltimore & Ohio, has been appointed superintendent of the Delaware, Lackawanna & Western, with headquarters at Buffalo, N. Y., succeeding George A. Poore, resigned.

M. J. Kennelly has been appointed acting general manager of the Kansas City, Mexico & Orient, with office at Wichita, Kan. Mr. Kennelly formerly was superintendent of the Missouri division of the Chicago, Rock Island & Pacific, with office at Trenton, Mo.

T. W. Parson, assistant superintendent of the Seaboard Air Line at Americus, Ga., has been appointed superintendent of the Florida division, with headquarters at Tampa, Fla., and H. W. Purvis, trainmaster at Americus, has been appointed superintendent of the South Carolina division, with headquarters at Jacksonville.

R. Colclough, assistant superintendent of the Intercolonial at Moncton, N. B., has been appointed assistant to the general superintendent of the Intercolonial and the Prince Edward Island, with office at Moncton; and H. B. Fleming has been appointed assistant superintendent of the Halifax and St. John district, with office at Moncton.

T. J. Foley, assistant general manager of the Illinois Central, at Chicago, has been appointed general manager, relieving W. L. Park, vice-president and general manager, of the duties of general manager. J. M. O'Day, superintendent of transportation of the Chicago & Eastern Illinois, has been appointed to the same position on the Illinois Central, with office at Chicago, succeeding George W. Berry, appointed general superintendent at Mem-

phis, Tenn., succeeding Sullivan S. Morris, appointed chairman of the General Safety Committee, with headquarters at Chicago, effective November 16.

W. D. Trump, who formerly was general superintendent of the Pere Marquette, has been appointed manager of the Detroit Terminal Railroad, with headquarters at Detroit, Mich. The Detroit Terminal is owned by the Grand Trunk, Michigan Central and Lake Shore & Michigan Southern. It was previously operated jointly, but is now under separate management.

Frank H. Worthington, whose appointment as superintendent of the St. Louis division of the Vandalia, with headquarters at Terre Haute, Ind., has been announced in these columns, was born September 11, 1874, at Steubenville, Ohio, and was educated at Rensselaer Polytechnic Institute, Troy, N. Y. He began railway work in the fall of 1894 with the Pennsylvania Lines West of Pittsburgh as assistant in engineering corps on the Pittsburgh division, and in September, 1897, was appointed assistant division engineer of the Indianapolis division. He was then successively division engineer of the Vincennes division, Richmond division, Cincinnati division, and of the Pennsylvania Lines Western division until January, 1905. On the latter date Mr. Worthington was promoted to the superintendency of the Peoria division of the Vandalia, remaining in that position until November, 1906, when he was transferred to the Michigan division as superintendent, and now becomes superintendent of the St. Louis division, as noted above.

Edward B. Rock, Jr., whose appointment as superintendent of transportation of the Atlanta, Birmingham & Atlantic, with headquarters at Atlanta, Ga., has been announced in these columns, was born on May 26, 1883, at Rock Hill, S. C., and was educated in the common schools. He began railway work as a telegraph operator in June, 1900, on the Charlotte division of the Southern Railway, and was later clerk in the superintendent's office, then trainmaster's clerk. His next position was copyist for despatcher and then until May, 1904, he was extra train despatcher. From May, 1904, until October 15, 1909, he was private secretary to J. S. B. Thompson, assistant to president of the same road at Atlanta, Ga. In October, 1909, he was appointed traveling freight agent of the Seaboard Air Line, first at Cordele and then at Atlanta. From February 1, to September 1, 1912, he was chief clerk to the general manager of the Atlanta, Birmingham & Atlantic, and now becomes superintendent of transportation of the same road, as above noted.

Frederick DeForest Kelsey, whose appointment as superintendent of the Breckenridge division of the Great Northern, with headquarters at Breckenridge, Minn., has already been announced, was born in March, 1877, at Calmar, Iowa. He was educated in the common schools and began railway work in 1891 with the Northern Pacific as call boy at Missoula, Mont. From 1893 to 1894 he was a telegraph operator for that road and was then for two years telegraph operator and cashier of the Chicago Great Western. He was subsequently freight brakeman on the Santa Fe Pacific and locomotive fireman on the Chicago, Milwaukee & St. Paul until 1900. Mr. Kelsey then entered the service of the Great Northern as freight brakeman, and was successively freight and passenger conductor, yardmaster, train despatcher, trainmaster and assistant superintendent of that road, and on September 1, 1909, was appointed superintendent of the Dakota division. He was transferred to the superintendency of the Montana division in December, 1910, where he remained until November 1, when he was made superintendent of the Breckenridge division, as noted above.

Traffic Officers.

E. E. Smythe has been appointed traffic manager of the Missouri & North Arkansas, with headquarters at Eureka Springs, Ark., to succeed C. D. Whitney, resigned.

J. H. Myler has been appointed commercial agent of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Buffalo, N. Y., vice R. E. Gavin, resigned.

David L. Griffin has been appointed city freight and passenger agent of the Union Pacific System and Southern Pacific Company, with headquarters at Atlanta, Ga., in place of S. H. Stanley, resigned.

Donald M. Munro has been appointed traveling passenger agent of the Union Pacific System, with headquarters at New York City, succeeding Alexander B. Lundquist, retired under pension rules of that company.

C. E. Felton, traveling freight agent of the Seaboard Air Line at Cordele, Ga., has been appointed commercial agent, with office at Savannah, succeeding H. F. Owens, resigned to accept service elsewhere. F. G. Roberts succeeds Mr. Felton.

H. F. Owens, commercial agent of the Seaboard Air Line at Savannah, Ga., has been appointed commercial agent of the Georgia & Florida, with office at Savannah, Ga., succeeding R. G. Parks, resigned to accept service with another company.

Hector M. McGinnis has been appointed general agent of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at Winnipeg, Man., in charge of freight and passenger traffic in Manitoba, Saskatchewan and Alberta—except west of Macleod; including Field, B. C., also the line of the Canadian Pacific, Winnipeg, Man., to Kenora, Ont., succeeding George A. Lee, promoted.

Engineering and Rolling Stock Officers.

E. R. Barnes has been appointed assistant engineer of the Public Belt Railroad of New Orleans, La., to succeed A. F. Barclay, resigned.

C. A. Tanheiser has been appointed engineer of maintenance of the Missouri, Kansas & Texas of Texas, with office at Denison, Tex., succeeding A. A. Matthews, assigned to other duties.

A. F. Barclay, assistant engineer of the Public Belt Railroad of New Orleans, has been appointed resident engineer of the Transmississippi Terminal Company, with headquarters at New Orleans, La.

Harry Clewer, whose appointment as superintendent of locomotive operation of the Rock Island Lines, with headquarters at Chicago, has been announced in these columns, was born on March 30, 1869, at Jackson, Ohio. He began railway work May 20, 1888, as machinist helper for the Kansas City, Osceola & Southern, and was subsequently until June 24, 1894, a locomotive fireman and engineer on that road. He then went to the Chicago & Alton as a locomotive engineer, and was later road foreman of engines and master mechanic, resigning in May, 1902, to go to the Chicago, Rock Island & Pacific as a locomotive engineer. He served successively as roundhouse foreman, road foreman of engines and master mechanic until his recent appointment as superintendent of locomotive operation of the entire system. In his new position Mr. Clewer will superintend the work of the supervisors of locomotive operation, through the master mechanics, to effect further economies in the use of fuel, locomotive supplies, lubricating material, and in the operation of the locomotive.

J. F. Sheahan has been appointed superintendent of motive power of the Atlanta, Birmingham & Atlantic, with headquarters at Fitzgerald, Ga., succeeding R. L. Doolittle, resigned to accept service elsewhere.

Mott Sawyer, superintendent of the Bellingham Bay & British Columbia, at Bellingham, Wash., has been appointed superintendent of construction of the Chicago, Milwaukee & Puget Sound, with headquarters at Lewiston, Mont.

W. C. Sealey, general foreman of the Grand Trunk at the Toronto, Ont., shops, has been appointed assistant master me-

chanic of the middle and southern division, with office at Toronto. G. M. Wilson succeeds Mr. Sealey.

T. M. Ramsdell, master car builder of the Chesapeake & Ohio, has been appointed master car builder of the Chicago & Alton, with office at Bloomington, Ill. W. T. Davis has been appointed superintendent of air brakes, with headquarters at Bloomington.

E. W. Hartough has been appointed assistant chief car inspector of the Pere Marquette, with headquarters at Grand Rapids, Mich. P. Alquist has been appointed chief inspector of the car department, with office at Grand Rapids, in place of W. H. Rourk, resigned.

D. C. Baird, supervisor of the Pennsylvania Railroad at Reading, Pa., has been appointed supervisor at Watertown, succeeding J. E. McIntyre, transferred. L. E. Wilt has been appointed assistant supervisor, with office at Watertown, succeeding J. B. Baker, Jr., promoted.

G. W. Curtiss has been appointed supervisor of the Northern Central, with office at Shamokin, Pa., succeeding F. C. Putney, transferred. R. J. Bond has been appointed supervisor at Baltimore, Md., succeeding J. M. Kinkead, promoted, and H. B. Welsh has been appointed supervisor at York, Pa., succeeding E. S. Hippey, transferred to the office of the principal assistant engineer, at Williamsport.

Purchasing Officers.

J. R. Mulroy, general storekeeper of the St. Louis & San Francisco, at Springfield, Mo., has been appointed general storekeeper of the Pullman Company, with office at Pullman, Ill.

OBITUARY.

H. C. Boughton, general agent of the Chesapeake & Ohio at Ashland, Ky., died on November 12, at Toledo, Ohio, aged 55.

Eugene M. Smith, assistant general freight agent of the Nashville, Chattanooga & St. Louis, at Nashville, Tenn., died on November 7 at that place. He was a son of H. F. Smith, vice-president and traffic manager of the same road.

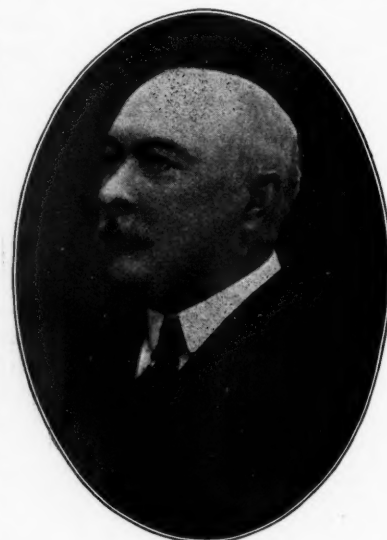
M. A. Malloy, master mechanic at the South Pittsburgh, Pa., shops of the Pennsylvania Railroad, died on November 3, at Pittsburgh. He was born at Salem, W. Va., on September 30, 1855, and was educated in the public schools. After completing his apprenticeship in a machine shop at Hollidaysburg, Pa., he entered the service of the Pennsylvania Railroad on April 14, 1879, as a machinist at the Altoona machine shops, and in April, 1881, was made inspector. In October, 1883, he was promoted to a gang leader, and in 1894 was made foreman. On January 15, 1902, he was made assistant master mechanic at the South Pittsburgh shops of the same road, and one year later he was promoted to master mechanic at the South Pittsburgh shops.

William A. Sprott, division freight and passenger agent of the Wabash, with headquarters at Danville, Ill., died November 9, at Urbana, Ill., aged 52 years. Mr. Sprott had been in the service of the Wabash since 1877, filling various minor positions in the freight department until October, 1889, when he was appointed commercial agent at Cincinnati, Ohio. He was promoted to division freight agent at Toledo in August, 1893, where he remained until March, 1912, when he was transferred to Danville, Ill., as division freight and passenger agent.

Henry M. Bronson, formerly and for many years in the passenger department of the Cleveland, Cincinnati, Chicago & St.



H. Clewer.



M. A. Malloy.

Louis, died recently at his home in Indianapolis, Ind. He was born on October 25, 1836, at Gambier, Ohio, and began railway work in 1853. He held various positions in the freight and passenger departments of a number of lines, all of which are now a part of the Cleveland, Cincinnati, Chicago & St. Louis. From March 1, 1890, to September 1, 1905, he was assistant general passenger agent. He retired from active duty on September 1, 1905, after 52 years of railroad service.

Clement A. Griscom, chairman of the board of directors of the International Mercantile Marine Company and a director of the Pennsylvania Railroad and the Long Island, died at his home at Haverford, near Philadelphia, Pa., on November 10. Mr. Griscom was born in Philadelphia in 1841, and after receiving an academic education, became a clerk with the shipping firm of Peter Wright & Sons, Philadelphia. He became vice-president of that company in 1871, and in 1888 he was elected its president. Shortly after becoming president he organized the International Navigation Company, which was merged in 1902 with the International Mercantile Marine Company. In 1904 he retired from the presidency of the International Mercantile Marine Company and later became chairman of its board of directors.

Reuben Wells, who was a railway mechanical officer, well known to the last generation, died at his home in Paterson, N. J., on November 8 at the age of nearly 83 years. He was born in Chester county, Pennsylvania, on January 1, 1829, and was a farmer boy until he was 17 years old. He then became a machinist apprentice on the Reading Railroad. From there he went to Shelbyville, Ind., as master mechanic of several roads, which were afterwards consolidated under the name of the Jeffersonville, Madison & Indianapolis, now a part of the Pennsylvania. It was while here, in 1868, that he designed and built one of the heaviest locomotives of its day for operating on the Madison incline. It attracted a great deal of attention at the time, and a report of it and its performances appeared in the proceedings of the Master Mechanics' Association for 1871. The diverse duties of the master mechanic at that time may be realized by the following instance. In the summer of 1863 two army corps from the army of the Potomac had to be moved to Nashville, Tenn., as quickly as possible and with no more public notice than was necessary. The army officer in charge of transportation arrived at Indianapolis only a few hours before the first company of the troops, and as both the president and the superintendent of the road were out of reach, Mr. Wells was for six days in entire charge of the road, operating it exclusively for the transportation of the troops from Indianapolis to Louisville. During this week, therefore, he acted as superintendent, master mechanic, yard master and even train despatcher. He was with the J. M. & I. for 25 years, during five years of which he was a trustee of Purdue University. In 1878 he went to the Louisville & Nashville as superintendent of machinery. He was appointed general manager in 1884, and the next year was made assistant to the president. In 1887 he left the Louisville & Nashville to become superintendent of the Rogers Locomotive Works, at Paterson. He was made manager of the works in 1900, and retained this position after the absorption of the Rogers Works in the American Locomotive Company. He resigned in April, 1907. From the date of its formation, and during the whole period of his active life, he was a prominent member of the American Railway Master Mechanics' Association, serving that organization as president from 1882 to 1884, and exerting an important influence on the actions of the society, in whose discussions he took great interest.



Reuben Wells.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE PAULISTA RAILWAY, Brazil, has ordered 4 ten-wheel locomotives and 1 Mallet locomotive from the American Locomotive Company.

THE ERIE, mentioned in the *Railway Age Gazette* of October 25, as having ordered 25 mikado locomotives from the Baldwin Locomotive Works, has increased this order to 30 mikado locomotives and has ordered 5 Pacific type locomotives from the Lima Locomotive Corporation, and 1 special Pacific type locomotive from the American Locomotive Company.

CAR BUILDING.

THE DULUTH, SOUTH SHORE & ATLANTIC has ordered 400 ore cars from the American Car & Foundry Company.

THE CHICAGO, TERRE HAUTE & SOUTHEASTERN has ordered 900 coal cars from the Haskell & Barker Car Company.

THE PITTSBURGH & LAKE ERIE has increased a recent order with the Pressed Steel Car Company for 500 coal cars to 1,500 coal cars.

THE ELGIN, JOLIET & EASTERN advises that it is not in the market for 1,000 hopper cars, as reported in the *Railway Age Gazette* of October 25.

THE ERIE has ordered 1,000 box cars from the Western Steel Car & Foundry Company, and 500 box cars from the Standard Steel Car Company.

THE NEW YORK, PHILADELPHIA & NORFOLK has ordered 800 box cars from the American Car & Foundry Company, and 50 gondola cars from the Ralston Steel Car Company.

THE NEW YORK, ONTARIO & WESTERN has ordered 500 fifty-ton, all-steel, gondola cars from the Cambria Steel Company, 300 box cars, 100 flat cars, 50 refrigerator cars and 50 stock cars from the Standard Steel Car Company.

IRON AND STEEL.

THE PITTSBURGH & LAKE ERIE has ordered 12,000 tons of rails from the Carnegie Steel Company.

THE PENNSYLVANIA LINES WEST have ordered 3,000 tons of structural material from the Pennsylvania Steel Company.

THE ATLANTIC COAST LINE has ordered 2,500 tons of structural material from the Virginia Bridge & Iron Works.

THE NORFOLK & WESTERN has ordered 12,500 tons of open hearth rails from the Tennessee Coal, Iron & Railroad Company.

THE INTERBOROUGH RAPID TRANSIT has ordered 1,000 tons of rails from the Maryland Steel Company, and 3,000 tons of rails from the Bethlehem Steel Company and the Lackawanna Steel Company.

THE NEW YORK, NEW HAVEN & HARTFORD has ordered about 65,000 tons of rails divided among the Pennsylvania Steel Company, the Bethlehem Steel Company and the Lackawanna Steel Company.

GENERAL CONDITIONS IN STEEL.—Since the first of November orders for new business have shown a decrease from the record breaking orders of last month, but there is a large volume of orders pending which will be placed in the near future, and manufacturers feel that there will be no marked decrease in orders for some time to come. Prices have been increased since the first of the month, and earnings of \$35,000,000 are expected for the present quarter of the Steel Corporation. The export business has shown a slight decrease due to foreign complications, but the demand in this country has been so great that the manufacturers have felt no apprehension. The steel plants are experiencing difficulty in obtaining sufficient cars to move the record-breaking output; this fact combined with the congestion at the mills is causing serious delays to many deliveries.

Supply Trade News.

Edwin Strassburger has been made vice-president of the Buffalo Brake Beam Company, New York, with office in St. Louis, Mo.

The Chicago Bearing Metal Company, of Chicago, has purchased 8.44 acres on the north side of West Forty-third street near Western avenue, Chicago, on which to erect a new \$200,000 fire-proof plant.

The Isthmian Canal Commission will receive bids until December 2 on miscellaneous supplies, including switches, switch stands, galvanized steel or iron, sheet brass, bronze bars, babbitt metal, etc. Circular No. 745.

Fred Lavis, 281 Reconquista, Buenos Aires, Argentina, who has charge of railway construction for the Argentine Railway Company, desires to obtain copies of catalogs issued by manufacturers of railway supplies, tools, machinery and various railway materials, including engineering supplies and drawing material.

The Roberts & Schaefer Company, Chicago, has received an order from the Illinois Central to build a Holmen, counter-balanced bucket, locomotive coaling station at Springfield, Ill., to cost about \$10,000. A coaling station of this type was installed last year by this company at Carbondale, Ill., on the Illinois Central.

At the annual meeting of the Pullman Company, Chicago, Le Roy Kramer was elected assistant to the president, succeeding C. S. Sweet, deceased. Mr. Kramer has held this position by appointment. All the officers of the company were re-elected and the directors were re-elected, except that F. O. Lowden succeeds H. C. Hulbert, deceased. George F. Baker was made a member of the executive committee, succeeding Mr. Hulbert.

Henry W. Jacobs, president of the Oxweld Railroad Service Company, Chicago, has just returned from a five weeks' trip abroad, in which he gave special attention to the investigation of oxy-acetylene welding and to the manufacture and exploiting of the Jacobs-Shupert fireboxes abroad. Arrangements for the handling of the Jacobs-Shupert fireboxes were made with Ganz & Company, of Budapest, Hungary, who have three large plants in Europe and make a specialty of building railway equipment, steamships, heavy gas engines and electrical machinery.

The exhibit of the National Railway Appliances Association, to be held in connection with the convention of the American Railway Engineering Association, at Chicago, March 18-20, will again be held in the Coliseum and the First Regiment Armory. Exhibitors can begin installing their exhibits on March 12, and the exhibition will be open from March 15 to March 21, inclusive, with the exception of Sunday, March 16. Substantially the same rules and regulations governing the exhibition of 1912 have been adopted for the exhibition of 1913. Information regarding space can be obtained from Bruce V. Crandall, secretary, Chicago.

Hiram J. Slifer, formerly general manager of the Chicago Great Western, is now a consulting civil engineer, specializing in steam railroad practice, with office at 209 South LaSalle street, Chicago. From 1878 to 1898 Mr. Slifer was connected with the Mexican National Construction Company, the Pennsylvania Railroad and the Chicago & North Western, doing reconnaissance, location, construction, improvement and maintenance work; from 1898 to 1905 he was superintendent of the Chicago & North Western and general superintendent of Chicago, Rock Island & Pacific; from 1905 to 1907, he was construction manager on steam railroad properties for J. G. White & Company, New York; from 1907 to 1909 he was assistant to the president and general manager of the Panama railroad and steamship lines; from 1909 to 1912 he was general manager of the Chicago Great Western. Mr. Slifer is a member of the American Society of Civil Engineers, American Railway Engineering Association, American Institute of Consulting Engineers and the Western Society of Engineers.

TRADE PUBLICATIONS.

REFRIGERATOR CARS.—The Moore Patent Car Company, St. Paul, Minn., has published, in supplement No. 1 to its general

catalog, 37 points in favor of this system of refrigeration, heating and ventilation; and in supplement No. 2, reports of tests of Moore refrigerator and heated cars.

FOUNDRY CRANES AND EQUIPMENT.—The Whiting Foundry Equipment Company, Harvey, Ill., has published catalog No. 99 on its foundry cranes and equipment. This catalog is illustrated and discusses foundry layouts, cranes, trolley systems, air hoists, cupolas, elevators, ovens, ladles, turntables, and sifters and foundry plants.

THREADING MACHINERY.—The Landis Company, Inc., Waynesboro, Pa., has published catalog No. 20 of its pipe and nipple threading machinery. These machines are illustrated and described in detail, and useful tables are included, giving the specifications of standard pipe and nipple machines and the number of threads per inch.

LATHES.—The South Bend Machine Tool Company, South Bend, Ind., has published catalog No. 42 of South Bend screw cutting engine lathes for foot power, engine power or electric motor drive. The catalog is illustrated, and the descriptions are clear and concise. Illustrations and prices of patent lathe tools and accessories are also included.

GEARS.—The Earle Gear & Machine Company, Philadelphia, Pa., has published a small illustrated booklet entitled Herringbone Gears, in which it discusses the relative merits of this type of gear as compared with ordinary gearing. It is claimed that the herringbone gear will deliver greater power with minimum friction and noise, and that it is particularly adapted to high speed.

WATER METERS.—The Neptune Meter Company, New York, has published an exceptionally handsome catalog of its water meters. These meters are made in three types as follows: The Trident disk meter for small service requirements; the Trident crest meter which measures by the velocity of the current and is intended for use where great volumes of water are handled; and the Trident compound meter which is a combination of both these principles and is for use where the velocity of the flow of water, though usually high, sometimes falls below a point that can be accurately measured by the velocity meter. The illustrations are in color and are remarkable for their clarity and for the impression of strength and simplicity which they convey. In addition to giving full descriptions the catalog discusses handling, setting and testing these meters, and includes tables showing weights, capacities and dimensions. The illustrations, paper, typography and the general arrangement are excellent in themselves and the combined effect of the whole leaves nothing to be desired even by the most critical.

NEW STATION FOR JAPAN.—The Imperial Government Railway of Japan is erecting a new passenger station at Nagasaki, which will be finished this month. The building is to be a two-story modern structure with commodious waiting rooms and offices, and will cost about \$50,000. The entire cost of the station is estimated at \$75,000.

AERIAL LINE IN TYROL MOUNTAINS.—According to a consular report a new aerial ropeway for conveyance of passengers up the Kohlerer mountain in the Tyrol has been completed and is to be opened shortly. There are two tracks, each consisting of a pair of steel ropes supported by twelve steel towers from which the cars, each having accommodations for 16 passengers, are suspended. The traction power is provided by ropes operated mechanically in a station at the head of the line.

TENDERS FOR CONSTRUCTION OF RAILWAYS IN SPAIN INVITED.—The Spanish government is inviting tenders with plans for the construction and operation of the proposed railway from Puertollana in the southeastern portion of the Ciudad-Real province southeast to Cordoba in the central portion of the province of Cordoba, about 70 miles; and also for the construction and operation of the proposed railway from Cifuentes, in the central portion of the province of Guadalajara, southeast to Orusco via Mondejar, in the southeastern portion of the same province, about 55 miles. Tenders will be received at the Direccion General de Obras Publicas, Ministerio de Fomento, Madrid, up to June 13, 1913, in the case of the first mentioned railway and up to January 12, in the case of the second. Local representation is necessary.

Railway Construction.

ALL RED LINE.—Applications will be made in Canada for incorporation by this company to build from a point near the eastern boundary of the province of Quebec west through the provinces of Quebec, Ontario and Manitoba to Winnipeg, Man. Branch lines are to be built south to Quebec, also to Montreal and to Ottawa. A branch is also projected to either Fort William or to Port Arthur. The Bicknell-Bain Company, Toronto, is interested.

ARDMORE, DUNCAN & LAWTON.—According to press reports this company will receive bids this month for work on the line from Lawton, Okla., via Duncan to Ardmore, about 100 miles. A. N. Bullitt is chief engineer, Lawton. (August 23, p. 366.)

ASHLEY, DREW & NORTHERN.—An officer writes that the company was organized to build from Crossett, Ark., north via Whitlow, Fountain Hill, and Monticello to Gillett, about 90 miles. The first section from Crossett to Fountain Hill, 23 miles, is now open for operation, and work is being carried out by the company's men on the rest of the line. The maximum grades are 0.5 per cent. R. O. Roy, president and general manager, and W. E. Atkinson, chief engineer, Monticello, Ark.

BARTLETT WESTERN.—According to press reports this company, which operates a line from Bartlett, Tex., west via Jarrell to Florence, 23 miles, is planning to build an extension east to Cameron, 31 miles.

CANADIAN NORTHERN.—Application has been made in Canada for an act authorizing the Canadian Northern to build a line from Montreal, Que., east to Sherbrooke, 110 miles.

CANADIAN PACIFIC.—Announcement has been made that this company will build two additional tracks on 600 miles to make a four-track system between Brandon, Man., and Lake Superior ports; the company will also soon begin double-tracking the main line between lake ports and Montreal.

CHICAGO, MILWAUKEE & PUGET SOUND.—A contract has been given by this company to build a 65-mile line from Great Falls, Mont., to Agawam.

DELAWARE & HUDSON.—This company will build a 7-mile line from Hudson, Pa., southwest along the west side of the Susquehanna river to a connection with its Buttonwood branch.

DETROIT, BAY CITY & WESTERN.—This company, which operates the line from Bay City, Mich., southeast to Caro, 29 miles, has recently completed an extension about 11 miles east to Wilmet, and expects to ultimately extend the line to Port Huron. Plans have been made for building a 10-mile branch north from Akron.

EDMONTON, DUNVEGAN & BRITISH COLUMBIA.—This company has issued stock, the proceeds of which are to be used to build from Edmonton, Alberta, via Dunvegan to the western boundary of the province of Alberta. The company has been granted permission to issue further stock for building additional lines in the province of Alberta. (October 4, p. 654.)

EL PASO & SOUTHWESTERN.—This company has finished work on the extension from Fairbanks, Ariz., west to Tucson, 66 miles. (September 20, p. 559.)

GRAND TRUNK PACIFIC.—According to press reports this company will build a 25-mile branch to Estevan, Sask., from a point on the present line, extending southeast from Regina.

JEFFERSONTOWN RAILROAD COMPANY.—Incorporated in Tennessee with \$200,000 capital. The incorporators include O. H. Anderson, J. C. Foreman, W. C. Anderson, F. T. Sparks and H. R. Anderson.

KANSAS CITY, MEXICO & ORIENT.—Work has been finished on the extension from Girvin, Tex., south to Fort Stockton, 32 miles, and the road is now in operation to that place. About all the grading work from Fort Stockton south to Alpine, 63 miles, has been finished, and it is thought that this section will be ready for operation by January, next. Financial arrangements are said to be made to resume work on the branch from San Angelo south to Del Rio on the Rio Grande.

MEXICAN EAGLE OIL COMPANY'S LINES.—An officer writes that a contract has been given to John Monahan, Apartado 150, Tampico, Mexico, to build a railway from LaPena to Portrero del Llano via Tanhuijo and Tierra Amarilla. Grading work has been started, and it is expected that track-laying will be begun within two months. The work involves handling 7,000 cu. yds. a mile. Maximum grades will be 2½ per cent. and maximum curves 12 degrees. Dr. C. W. Hayes, first vice-president.

NEWTON, KANSAS & NEBRASKA.—Organized in Kansas to build from Newton north via Goessel, Canton and Roxbury to either Salina or Abilene, about 70 miles, and eventually to Fairbury, Neb. Surveys have already been made. T. H. McManus is president, Newton, Kan.

OKLAHOMA CENTRAL.—According to press reports an extension is to be built at once from Lehigh, Okla., south to Midway about five miles.

OIL BELT (Electric).—This company, operating a nine-mile line from Oblong, Ill., is to be extended, it is said, to Bridgeport, thence to Mount Carmel. W. E. Finley is back of the project which is being financed by Indianapolis capitalists.

QUANAH, ACME & PACIFIC.—This company, operating a 42-mile line from a connection with the St. Louis & San Francisco at Quanah, Tex., southwest to Paducah, has been authorized to issue \$10,000,000 of bonds. It is proposed to eventually extend the line west to a connection with the Atchison, Topeka & Santa Fe, such a line would provide the St. Louis & San Francisco with a new route to territory now reached by the Atchison. (September 20, p. 559.)

SOUTH CAROLINA WESTERN.—This company has opened for business an extension of its Sumter division from Bishopville, S. C., to Sumter, 22 miles. (July 26, p. 185.)

RAILWAY STRUCTURES.

ALTOONA, PA.—A new engine house will be built by the Pennsylvania Railroad at the western limits of Altoona. It will contain forty stalls. Machine and blacksmith shops will also be built and equipped with an electric traveling crane. A mechanically operated coaling station will be installed, and two 50,000 gal. tanks will supply water. Smaller buildings will also be included in the new plant. The structures will be of steel and concrete construction.

DOUGLAS, ARIZ.—The El Paso & Southwestern has awarded a contract for a new passenger station.

GALVESTON, TEX.—The Gulf, Colorado & Santa Fe has asked bids for the erection of its \$500,000 union depot and general office building. Alternative plans have been prepared for a six-story and for an eight-story building 100 x 125 ft.

HARTFORD, CONN.—According to press reports the Central New England has started work on a new one-story brick freight shed 37 ft. x 315 ft., and an addition to the present office building 30 ft. x 28 ft. is also being put up, two and a half stories high. (July 26, p. 186.)

MONTREAL, QUE.—The Canadian Northern, Ontario, has been given authority to build bridges across St. Lawrence boulevard and across St. Denis boulevard.

NASHVILLE, TENN.—The Foster-Creighton-Gould Company, which has the contract for the bridge across the Cumberland river, about four miles above Nashville, for the Louisville & Nashville, expects to complete the substructure next month. The bridge will be 3,000 ft. long and 130 ft. high. The superstructure is composed of a 300 ft. channel span, three 200 ft. through spans, three 125 ft. deck spans and a viaduct approach at each end composed of 30 ft. towers and 60, 70 and 80 ft. spans.

TORONTO, ONT.—A contract has been given by the Canadian Northern Ontario to the Canada Foundry Company, for fabricating the steel work and erecting a steel deck plate girder viaduct over the Humber river at Toronto. (October 18, p. 776.)

TULSA, OKLA.—The St. Louis & San Francisco is planning to erect a double track steel bridge over the Arkansas river at this point, in addition to completing the West Tulsa yards and building a 24-stall roundhouse.

Railway Financial News.

ARIZONA EASTERN.—The company has asked the Arizona Corporation Commission for permission to issue \$600,000 additional bonds. The Southern Pacific owns \$3,673,000 of the outstanding \$7,000,000 first and refunding mortgage bonds.

BEAVER & ELLWOOD.—The entire outstanding issue of \$150,000 first mortgage 4 per cent. bonds of this company, which is a subsidiary of the Pittsburgh & Lake Erie, dated July 1, 1899, have been called for payment at par and interest on December 1 at the Guaranty Trust Company of New York. This road runs from Ellwood Junction, Pa., to Ellwood City, 3 miles.

BOSTON & LOWELL.—This company offered for sale at public auction in Boston, on November 13, \$280,000 of stock. This company, which is leased by the Boston & Maine, runs from Boston, Mass., to Lowell, and with branches has a total mileage of 111 miles.

BOSTON ELEVATED.—On November 4 the stockholders authorized an issue of \$4,000,000 additional stock to be offered to the shareholders at 105, to provide for such expenditures as the Massachusetts railroad commission shall approve; and an issue of \$5,000,000 30-year bonds to be secured by a mortgage which will also secure all the outstanding bonds of the company, which comprise \$18,300,000 debenture bonds. The proceeds of this bond sale will be used for new construction, equipment, etc., refunding floating debt and payment of other debts.

Galen L. Stone has been made a director of this company.

CHICAGO & WESTERN INDIANA.—This company has called for payment, on December 1, \$109,000 6 per cent. general mortgage bonds of 1882 at 105 and interest at the office of J. P. Morgan & Co., New York.

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—The common stockholders will vote on November 19 on the question of authorizing this company to make an agreement with the trustees of the Cincinnati Southern, supplementary to the existing lease under which the rent payable by the Cincinnati, New Orleans & Texas Pacific shall be increased by an amount sufficient to pay the interest on the bonds of the city of Cincinnati to be issued to create a fund whereby the trustees of the Cincinnati Southern may complete the terminal facilities, and to provide a sinking fund for the redemption of these bonds at their maturity. The bonds, however, are not to exceed \$500,000, and to be issued at not exceeding \$100,000 a year.

CINCINNATI SOUTHERN.—See Cincinnati, New Orleans & Texas Pacific.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—F. J. Jerome and L. J. Hachney have been elected additional directors. This now makes a board of 15 directors.

DETROIT, BAY CITY & WESTERN.—The National City Bank and Chapman, Mills & Company, both of Chicago, are offering at 94 and interest the present issue of \$300,000 first mortgage 5 per cent. sinking fund bonds, dated October 1, 1912-1932, but redeemable at par and interest upon 60 days' notice on or prior to October 1, 1922; thereafter at 105 and interest. The total authorized issue is \$1,250,000. The remaining \$950,000 bonds may be issued for additional terminal facilities at not exceeding 75 per cent. of cost, and for completed mileage at not exceeding \$8,000 per mile, exclusive of sidings, switches, etc., provided that the annual net earnings are twice the interest charges, including the bonds proposed to be issued. This road runs from Bay City, Mich., to Caro, 29 miles.

DETROIT, TOLEDO & IRONTON.—The foreclosure sale of this company has been further postponed until January 8, 1913.

GALVESTON, HOUSTON & HENDERSON.—Application has been made to the Texas railroad commission for permission to issue new bonds to refund the outstanding issue of \$2,000,000 bonds which matures in April, 1913. The Texas railroad commission will make a revaluation of the property before it authorizes this issue.

GEORGIA & FLORIDA.—Douglas H. Gordon, president of the Baltimore Trust Company, has been elected a director, succeeding George C. Morrison, deceased.

INTERNATIONAL & GREAT NORTHERN.—A dividend of 4 per cent. has been declared on the \$5,000,000 preferred stock payable January 2, making, with the initial dividend of 1 per cent, paid August 1, 1912, a total of 5 per cent. from the earnings of the fiscal year ended June 30, 1912.

An issue of \$396,253 additional bonds was authorized by the Texas railroad commission on November 1, on account of new equipment including 10 freight locomotives, 75 ballast cars, 100 tank cars, 7 passenger coaches, 6 chair cars, 7 baggage and express cars.

KANSAS CITY SOUTHERN.—The \$210,000 4½ per cent. equipment notes, series B, maturing later than December 1, 1912, have been called for payment at par and interest on that date at the office of Blair & Company, New York.

LOUISVILLE & NASHVILLE.—See Louisville, Henderson & St. Louis.

LOUISVILLE, HENDERSON & ST. LOUIS.—Keith L. Bullitt, of Louisville, Ky., has been elected a member of the minority preferred stockholders' committee, succeeding William M. Bullitt, resigned. This company is owned by the Louisville & Nashville.

MAINE CENTRAL.—Kidder, Peabody & Company, and Kissel, Kinicutt & Company, both of New York, are offering the \$4,500,000 Portland Terminal Company first mortgage 4 per cent. bonds dated July 1, 1911-1961. These bonds are guaranteed, principal and interest by the Maine Central, and are secured by a first lien on the freight and passenger terminals in Portland, South Portland and Westbrook, Maine, used jointly by the Boston & Maine and the Maine Central. The property is valued at \$5,700,000.

NATIONAL RAILWAYS OF MEXICO.—The \$13,000,000 one-year loan negotiated with Kuhn, Loeb & Company, Speyer & Company, Ladenburg, Thalmann & Company and Hallgarten & Company, all of New York, which matures November 15, has been extended for one year.

PITTSBURGH & LAKE ERIE.—See Beaver & Ellwood.

QUANAH, ACME & PACIFIC.—William Salomon & Company, New York, and G. H. Walker & Company, St. Louis, are offering first mortgage 6 per cent. bonds dated October 1, 1909. The amount authorized is \$10,000,000 and the amount outstanding \$958,000. An issue of \$1,000,000 will be made as soon as sanction can be obtained from the Texas railroad commission. The St. Louis & San Francisco guarantees to purchase, pay off or redeem these bonds at 105 and interest on or before July 15, 1921, and also guarantees all interest coupons.

SOUTHERN PACIFIC.—See Arizona Eastern.

WABASH PITTSBURGH TERMINAL.—The \$973,000 first lien, 6 per cent. receiver's certificates, which matured November 1, have been extended for three months.

WHEELING & LAKE ERIE.—The various issues of receiver's certificates, all of which matured on November 1, having been extended for three months, at 5 per cent., have been further extended for three months.

ITALIAN RAILWAY ELECTRIFICATION.—The administration of the Italian state railways is now considering a scheme for the electrification of a great part of the lines, and for a start it is proposed to electrify the 12-mile line from Rome to Ancone. Water power from the falls of Terni and Fabriano will be utilized for the generation of the electricity, and it is stated that if the results of the working of this section prove satisfactory the administration intends to arrange for the gradual electrification of the whole railway system.

PROPOSED LINES FOR URUGUAY.—The President of Uruguay has asked for authority to at once construct the main line from Montevideo as far as the Rio Negro, the western branch from La Lata to Nueva Palmira, and the extension from San Carlos to Rocha. References are also made to the La Paloma-Treinta y Tres line, the concession for which was recently acquired by an American-Canadian group of financiers, and to the Coronilla-Santa Rosa project, which completes the government's system. The total mileage will be about 600 miles.